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I.

THREE CASES OF LABYRINTHINE SUPPURATION COMPLICATING PURULENT OTITIS MEDIA.*

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NEW YORK.

Suppuration of the labyrinth is a subject which has attracted more and more attention on the part of the otologist during the past decade. Owing to the fact that the labyrinthine fluid is separated from the tympanum only by the foot-plate of the stapes and by the comparatively thin membrane of the round window, it seems rather surprising that invasion of the labyrinth is not more frequently reported as a sequel of chronic middle-ear suppuration. Unquestionably, the labyrinth is more frequently involved in a suppurative process than the records of most otologists show. Our attention has been drawn to this complication of purulent otitis media chiefly in connection with fatal cases, and from the fact that in quite a large proportion of fatal cases—especially in those instances where death has fol-

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lowed as the result of cerebellar abscess—the path of invasion has been traced directly from the middle ear, through the labyrinth, through the internal auditory meatus, to the cerebellum.

Quite frequently, a suppurative inflammation of the labyrinth is found at the time of operation, although, from the clinical history, the condition could not have been diagnosticated prior to the operation. In other instances, however, there is a distinct history, which should lead the operator to suspect labyrinthine involvement.

In the cases about to be reported, such a clinical history was given in one case. In two others, the labyrinthine involvement was found at the time of operation, there being no suspicion on the part of the operator, at the time surgical interference was advised, that such a condition existed.

The first case was that of a young man of 31 who presented himself at the New York Eye and Ear Infirmary, with a history of chronic suppurative otitis media, which had lasted for a period of years. Within the two weeks before the patient came under observation, he had suffered from severe vertigo and headache. The vertiginous symptoms had been steadily increasing. The case was reported to me simply on account of the chronic suppuration, and the consequent indication for relief by a radical operation. After obtaining the history, I expressed the opinion that we should very likely find suppuration of the labyrinth. The radical operation was performed in the usual way. When the horizontal semicircular canal was exposed, a carious area was found which involved the entire thickness of the canal wall. Curettage easily opened the lumen of the canal. This opening was enlarged until the lumen of the bony canal could be distinctly seen. The carious canal wall was cautiously removed forward to a point just above the oval window. The crura of the stapes were carious. The stapes was removed, and the entrance to the oval window was enlarged. In this way, free drainage of the vestibule was obtained. A narrow strip of iodoform gauze was inserted into the oval window, and was also made to cover the opening in the horizontal semicircular canal. The entire radical cavity was then packed with iodoform gauze, and the wound sutured. An uninterrupted recovery took place in this case, and the vertigo entirely disappeared after the operation. In this instance, invasion of the labyrinth undoubtedly took place through the horizontal

semicircular canal. The involvement was so extensive, that it seemed wise to the operator not to rely upon drainage of the carious area alone, but to secure complete drainage of the labyrinth by removal of the stapes, thus securing drainage of the vestibule. The complete recovery of the patient seemed to justify the operative procedure. Two months after the operation, the acoumeter was heard at 6 inches, in the affected ear, and the forced whisper at 18 inches. There was still a slight odorless discharge from the canal.

The second case was that of a boy, aged 14, who had been suffering from a chronic suppurative otitis media, involving the right ear, for a number of years. There had been no symptoms indicative of labyrinthine involvement. On performing the ordinary radical operation, an eroded area was found, leading into the horizontal semicircular canal. The outer wall of the bony canal was removed for a considerable distance, until the probe could be passed downward, forward and inward into the vestibule. A narrow strip of gauze was carried into the opening into the semicircular canal, the radical cavity packed with iodoform gauze, and the ordinary dressing applied. This patient made an absolutely perfect recovery. An examination of the case six weeks after the operation, showed the ear practically dry, there being but a slight serous discharge. The hearing upon the right side, for the acoumeter, was 1 foot, the forced whisper, 3 feet. It should be stated in this connection, that this boy was suffering from a double suppurative otitis media, and that the radical operation was also subsequently performed upon the left side; there was no labyrinthine involvement upon this side. Upon the left side, the acoumeter was heard at 6 feet, and the forced whisper at 9 feet. The tests of hearing made prior to operation were somewhat unsatisfactory, but in this particular case, seemed to indicate that the patient's hearing was considerably impaired, as the result of operation, particularly upon the right side, that is, the side upon which there was labyrinthine involvement.

Two other similar cases, occurring in children—one in an infant only a few months old—have also been operated upon within the past year, by the same method, and in each instance, recovery has been perfect. In the case of the young infant, ten weks of age, an erosion of the horizontal semicircular canal was found complicating an acute otitis. Here, the radical operation was not performed. A simple mastoid operation was

done, and the eroded area on the outer wall of the external semicircular canal was curetted, opening the lumen of the canal. The wound was dressed in the usual way, care being taken to shut off the lumen of the canal from the remainder of the wound, by a strip of iodoform gauze packing. Complete recovery took place in this case. I cite this case simply to show at how early an age we may have erosion of the labyrinthine wall.

In the third case, that of a girl, aged 12, suffering from chronic middle-ear suppuration, with no symptoms of labyrinthine involvement, the radical operation was performed simply for the relief of the suppuration. Toward the end of the operation, the region of the oval window was found to be filled by granulation tissue. An attempt was made to remove this, and although the curette was used with the utmost gentleness, the stapes was extracted. The stapes apparently lay loose in the oval window and the foot-plate was considerably atrophied. The probe could be passed directly into the labyrinth. A strip of gauze was packed into the pelvis ovalis, and the radical cavity dressed in the usual manner. This patient had rather persistent nausea for forty-eight hours after the operation, but ultimately made a complete recovery. One month after the operation there was only a very slight amount of discharge from the ear, and the acoumeter was heard at 3 feet on the affected side, the forced whisper at 3 feet.

These cases are reported to show the frequency with which the labyrinth may be involved. The three cases specifically cited occurred during my last twenty-eight radical operations. From the history of these, we find that there are two avenues by which the labyrinth may be invaded: The first and most common, through the bony wall of the horizontal semicircular canal, and second, directly through the oval window. It is a question in my own mind as to whether, in many of the cases where we have suppuration after a complete radical operation, we have not to do with a suppuration of the labyrinth. All who have performed many radical operations, must have been impressed with the fact of how frequently we find granulation tissue in the pelvis ovalis. Many of us rather hesitate to interfere with granulation tissue in this neighborhood, for fear of extracting the stapes. I am inclined to believe that we have been rather too conservative in this direction. Granulation tissue about the stapes should be treated the same as granula-

tion tissue in any other part of the tympanic cavity, and if it is necessary to remove the stapes in order to free this portion of the tympanum from granulation tissue, the stapes should be removed. Naturally, if there is no evidence of suppuration of the labyrinth after removal of the stapes, the oval window should not be enlarged, and the operator should content himself by simply shutting off the pelvis ovalis by means of a gauze drain, to prevent involvement of the labyrinth through the middle ear. If, however, pus is seen to flow from the oval window, the oval window should be enlarged forward and downward, so as to completely drain the vestibule. In those cases where the horizontal semicircular canal is the site of the invasion, the procedure will depend upon the extent of the labyrinthine involvement. If no pus flows from the semicircular canal, after the opening is enlarged, and if no granulations are present about the oval window, the operator may content himself simply by draining the labyrinth through the horizontal semicircular canal, and from the cases which have come under my observation, I can say that he will feel fairly certain of eradicating the labyrinthine involvement by this method. If, however, there seems to be extensive involvement of the labyrinth, the opening of the semicircular canal alone, will not suffice. After the canal has been thoroughly drained, the stapes should be extracted, provided its foot-plate is in position, and the oval window should be enlarged downward and forward, so as to freely drain the vestibule.

The cases reported are also interesting as showing the effect of interference with the labyrinth, on the power of audition. In all of the cases the hearing was made considerably worse, as one would naturally expect. For this reason, therefore, the surgeon should avoid opening the bony labyrinth, unless he is absolutely certain that disease exists in this region; in other words, it should not be opened either through carelessness or for purely experimental purposes, as drainage, even of the semicircular canal will probably cause some impairment in the hearing, owing to the change which it causes in labyrinthine pressure. At least, this seems to have been the result in my own cases.

Regarding the advisability of extracting the stapes, I naturally believe that the stapes should be left *in situ*, in performing the radical operation, unless the pelvis ovalis is so filled with granulation tissue that it is impossible to clear this away with-

out removal of the ossicle. In cases where the ossicle comes away during cautious curettement of the oval nitch, we will always find, probably, that the stapes is diseased. The cautious extraction of a healthy stapes should cause practically no interference with audition, as has been proven in many cases where the stapes has been removed either intentionally or accidentally during an ossiculectomy. If granulations are found in the oval window, and upon curettement the stapes comes away, the operator should pass a delicate probe into the pelvis ovalis, to determine whether the oval window still remains closed by fibrous tissue, or whether the probe can be introduced directly into the vestibule. Naturally, the utmost gentleness must be used in conducting this manipulation, as otherwise, the membrane of the oval window might be ruptured, and infection of the labyrinth take place at the hands of the operator. If the vestibular membrane is found to be ruptured, I do not think it wise to enlarge the oval window, unless pus can be actually seen coming from the labyrinth. If the removal of the stapes shows a suppuration of the labyrinth, that is, if pus flows from the oval window after the stapes has been removed, enough of the external labyrinthine wall should be removed to afford free drainage. This is best done by the cautious use of a slender gouge and small curette, enlarging the oval window downward and forward. In other words, removing the promontory and destroying the first turn of the cochlea.

Still freer drainage can be obtained in these cases by removing the external wall of the horizontal semicircular canal as well, and this, I believe, should be done in cases where the labyrinthine involvement is extensive.

When the external semicircular canal and the vestibule are both open, the operator must remember that it will be impossible to break down the bony wall completely between these openings without destroying the facial nerve where it runs above the oval window. There is no necessity, however, for breaking down this small bony wall. The wall of the external canal can be removed cautiously as far as the aqueductus Fallopii, the thin bridge of bone, lying just above the oval window, and containing the facial nerve, being allowed to remain. The presence of this ridge does not in the least interfere with drainage.

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DISCUSSION.

DR. EAGLETON: Dr. Dench spoke of two of his three cases as being cases in which there was no suspicion of the labyrinth being involved. During the last two years we have had at the Eye and Ear Infirmary seven cases of labyrinthine suppuration. About a year ago I had an occasion to read an article by Stearn of St. Petersburg, before the Congress of Bordeaux, in which he calls attention to the disturbance of the equilibrium in labyrinthine suppuration. He speaks of the indifference of patients suffering with labyrinthine suppuration and the varying delicate movements in coordination, but he chiefly calls attention to the fact that those patients are not able to execute the hopping movement. He has his patient bring his feet together and hop with both feet together. In some cases the patient is absolutely unable to hop; while in all cases, as I judge from the article, if their eyes are closed, they hop one or two steps, and some fall. The majority don't hop with that degree of certainty that a normal person does. Since reading this article we have been able to diagnosticate three cases of labyrinthine suppuration that had no other symptoms. They were unable to execute the delicate movements of coordination that Stearn calls attention to. In my practice, in every case of chronic otorrhea, the patient goes through those movements as a part of the examination.

DR. JOHN D. RICHARDS: During the past few years I have had nine cases of labyrinthine invasion, five of actual suppuration and four in which there was a necrosis of various parts of the labyrinth. The usual place of infection, in these cases, has been through the horizonal semicircular canal, and in one instance there was an extension through the first coil of the cochlea; in another instance through the oval window, and another instance there was perforation through the capsule leading down into the vestibule, the perforation being immediately above the semicircular canal. All these cases were operated upon and in a large portion of them they showed no symptoms whatever, that is, there were no symptoms calling special attention to labyrinthine invasion, but simply that they were victims of chronic suppuraive otitis. In one of the cases in which the arches of the semicircular canals, the cochlea and the vestibule were removed and only the ampullary areas of the canals were left, the patient heard all of the Hartmann set forks and the thirty-five thousand Koenig's rod. There is, as a rule, in the case

where the labyrinth is involved, a tendency to fall towards the opposite side from that involved. In regard to the statement made by Dr. Dench as to the removal of bone extending from the oval window downward and forward, I don't think, in those cases, that we can confine our operative procedure to such definite limits. When the vestibule was invaded, the cases which I have seen have had the cochlea invaded also. The hopping which Dr. Eagleton speaks of I have tried in several cases in which the internal ear has been involved. The patient hops and upon lighting then falls to the side opposite to the side of involvement. In one instance I had an acute suppuration of the labyrinth which followed an acute mastoiditis. An operation was performed, and there was found a perforation through the inner wall of the vestibule, around the origin of the internal auditory meatus. An epidural cerebellar abscess was present and the disease had invaded the petrous portion of the temporal bone requiring an exenteration of the petrous. In regard to avoiding injury to the facial nerve, which is a question we have got to consider in cases in which the internal ear is involved, I would say that the facial nerve is secondary in importance, but we can, as a rule, avoid injury to it by preserving a gutter of bone or arch for the nerve to run in, extending from the internal auditory meatus down to the lower portion of the facial ridge. In one of these operations a little incident occurred which shows how unexpected difficulties may arise. In removing the external wall of the Fallopian canal a little annulus or ring of bone separated by cleavage and encompassed the nerve. It was very difficult to get hold of and to separate from the nerve without injury to that structure and it makes an exceedingly annoying complication. Paralysis of the facial nerve always occurs when that nerve is exposed throughout its circumference. If the nerve is not injured, that is, not cut across, we will, as a rule, get almost complete recovery in about four months. Every case that I have operated upon, in which the entire labyrinth has been removed, has shown facial paralysis and every one of them has recovered to a great extent the function of the nerve at the expiration of from four to five months. In no instance was the nerve injured, except through its exposure.

Dr. Wendell Phillips: So far as I can recall the cases that I have observed, where I have been positive that there was suppuration of the labyrinth present even to a small degree, I

have been able to get a history of vertigo. I would like to ask Dr. Dench, or any one else, if he ever failed to get that sign. It has always been present. Sometimes the patient might not mention it, but by going carefully into the case I have been able to get that symptom. I have never tried the experiment Dr. Eagleton has mentioned, but I am inclined to think that you may try that experiment on a great many comparatively well people and you would find that they could not make over three hops without falling down. I imagine if Dr. Eagleton would try that himself he would pretty nearly get that result.

DR. EAGLETON: In regard to Dr. Phillips' remark I will say that I have had many hundreds of people hop during my connection with the Newark Eye and Ear Infirmary. In cases of chronic suppuration the hopping is part of the routine. The last case that I had will illustrate. When I saw the man I said, "This man has labyrinthine suppuration, I am very sure." Twice previous I had felt moderately sure. The last time I felt positive. It was as the result of observing previous cases. What Dr. Phillips says is true concerning one or two hops with the feet together, I think, when there is a game leg, that they feel a little wobbly. A normal man hops with a degree of assurance. The first time he may fall down but after he has done it once or twice he begins to hop with a degree of assurance, while one suffering with labyrinthine suppuration never has that nor can he acquire it. It is a diagnostic point that in my personal experience is attended with the greatest of value in looking for the inability to execute certain coordinate movements.

DR. RICHARDS: In cases which have come on with fair rapidity, vertigo, in my experience, has been present. Cases that have come on gradually are evidenced by the fact of chronic suppuration in the labyrinth, but the invasion has been so insidious that absolutely no symptoms whatever could be observed except that in some instances there has been slight nystagmus, and in one instance in which the entire labyrinth was obluted, the patient was some weeks later sitting in a room where a piano was being played. He said it caused such dizziness that he fell over, and for some weeks he could not hear music without having vertigo.

DR. DENCH: In reference to Dr. Phillips' remarks, in certainly one-third of the cases there has been no vertigo at all. The experiment of which Dr. Eagleton speaks, I have never tried.

With reference to what Dr. Richards says concerning the facial nerve, in cases where there is very extensive involvement, of leaving a small ridge of bone, I make mention, in my paper, I think, of the desirability of preserving the integrity of the facial nerve except in those cases where you have very considerable destruction of the labyrinth. If you practically take away the entire petrous and temporal bone the facial nerve will suffer. In a good portion of the cases, you can drain your labyrinth thoroughly without sacrificing the integrity of the facial nerve.

II.

CLINICAL VALUE OF THE DIFFERENTIAL BLOOD COUNT IN A CASE OF ACUTE BRAIN DISEASE AND IN A CASE OF ACUTE DOUBLE MASTOIDITIS.

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In presenting for your consideration the report of these two cases, one of temporo-sphenoidal abscess, and the other of acute double mastoiditis, I realize fully that they are of but little value as conclusive proof. I offer them rather as illustrative and typical cases where all those classical symptoms are present which call for operative interference, and as instructive cases, especially in the light of the different findings of the examination of the blood, and in particular the varied polynuclear percentages which we are now taught to believe indicate the presence of pus and the severity of pus infection. It is not within the province of this paper, although the temptation is great, to discuss the various methods of blood examination, the composition, formation or changes of blood cells or the deductions therefrom, in so far as they may influence the general economy, but to call attention specifically to the clinical value of the differential blood count in these suppurative cases.

Max Einhorn, in a thesis written in Berlin, in March, 1884, calls attention to the fact that in puerperal sepsis he found that the normal percentage of lymphocytes was diminished and that the polynuclear percentage was higher than normal; but in his article, he gave no reason for the two conditions coexisting, nor did he draw any conclusion therefrom—a fact was simply stated.

F. E. Sondern, however, in several interesting papers, notably one read before the Surgical Section of the Academy of Medicine in New York, on February 3, 1905, is the first one to make clear to the surgeon the meaning of the differential blood count and to present firm, clear-cut opinions as

the result of long and careful investigation. Sondern makes three strong statements:

First.—"A relative percentage of polynuclear cells, below 70, with an inflammatory leucocytosis of any degree, excludes gangrene or pus at the time the blood examination is made, and usually indicates good body resistance toward infection.

Second.—An increased relative percentage of polynuclear cells, with little or no inflammatory leucocytosis is still an absolute indication of the inflammatory process, and the polynuclear percentage is a direct guide to the severity of the infection.

Third.—An increased relative percentage of polynuclear cells with a decided inflammatory leucotytosis is an accurate guide to the status of the inflammatory lesion."

These are clear, strong conclusions certainly, and, coming from an observer of standing who supports his arguments with a tabulated list of over 1700 cases, demand the attention and consideration of those interested in aural surgery.

Sondern further tells us that in the healthy adult of the middle or upper classes a normal leucocytosis in 1 cmm. of blood in 1 to 100 dilution averages about 6700; while a normal polynuclear neutrophile percentage averages about 62 per cent.

There are other observers, notably the Germans, who differ as to these normal averages, some, indeed, claiming a hypoleucocytosis of 25,000 to 30,000 necessary in order to indicate pus.

Ewing, in his work on the Clinical Pathology of the Blood, states that Ehrlich's figures may serve as a standard for healthy adults, viz., lymphocytes 22 to 25 per cent and a polynuclear neutrophile count of about 70 to 72 per cent to the 1 cmm. of blood.

Again, Limbeck, in an article published in 1889, asserts that an 80 per cent polynuclear count is well within normal limits, while T. W. Hastings in his brochure on Blood Terminology considers the polynuclear count of from 60 to 75 per cent and a leucocytosis of 7500 standard.

Despite these variations made by different observers in the normal blood count, it may be fairly established that for clinical purposes a leucocytosis of from 6000 to 10,000 and polynuclear count of from 58 to 70 per cent may be taken as a basis for comparison.

In a paper read by C. L. Gibson before the Surgical Society of New York a few weeks ago, the author distinctly asserts his belief in the clinical value of the differential blood examinations in pus infection, although in some few cases it had failed him establishing a diagnosis. He proposed a chart which should picture the relative infection of a given case by means of slanting lines drawn from the highest point of leucocytosis to the high point of polynuclear percentage, the difference in the pitch of these slanting lines denoting the severity of infection. For us, however, who have to deal with infective cases, the clinical value of a differential blood count rests on two proven facts: First, that a relatively high leucocytosis means a relative body resistance and that a relatively high polynuclear percentage means a relatively severe pus infection.

Admitting then these two conclusions, immediately we are brought face to face with the fact that in some instances the laboratory findings do not agree with the clinical picture of our acute aural suppurative cases.

The question then arises as to whether we are to disregard these differential blood counts and depend entirely upon clinical observation and experience, or despite a servere inflammatory condition, depend solely upon our laboratory reports. I would bring to your notice:

Case I.—On July 1, 1905, I was called upon to take charge of J. R., a Cuban, 16 years of age, who had undergone on June 22, 1905, a radical operation, with primary skin grafting for chronic suppurative condition of the left ear, which had existed on and off for over eleven years. The wound at this time was doing well in every way, there being only a slight muco-purulent discharge, while the skin grafts had apparently effected union with the exposed open area. At the time of his operation, there had been exposure of lateral sinus or dura.

From the day I first saw this case, the middle ear cavity was dressed daily through the external cavity and the posterior line, which had broken down four days after operation, was also dressed with iodoform gauze and a fairly large mastoid dressing was applied.

The condition of the wound improved daily until July 15th, when the patient was discharged from the hospital, to report to the office for further local treatment. During the

period of July 4th to 15th, it had been noticed that his pulse had been rather slow, ranging from 60 to 70; that he had had several attacks of nausea and vomiting, which were never at any time serious, and were thought to be due to slight bilious attacks or indigestion, and that the patient was irritable, in sharp contrast to what he had been before the operation. The patient's appetite was not good and he complained of feeling weak, while the temperature varied from normal to 99 and 99½ degrees. The patient had been up and dressed and had taken several walks and drives during his last week at the hospital. For the next three or four days after leaving the infirmary, he complained of some frontal headache, continued general weakness and lack of appetite. It was also observed at this time that irritability was increasing. On July 20th, Thursday, he became nauseated, the headache became persistent and he was obliged to remain on his couch most of the day. His temperature during this interval was normal, but his pulse ranged from 60 to 68.

On July 21st, Friday, there was persistent vomiting which could not be controlled. He was drowsy all the time, his speech was not connected and articulation was not perfect.

On Saturday, July 22d, the temperature suddenly went to 102.2°, pulse rate was still slow, about 64, the vomiting was continuous and the mental condition was worse.

On Sunday, July 23d, all his symptoms were exaggerated and the temperature rose to 104.2°; sensory aphasia now developed, and all reflexes were diminished. A consultation was held, immediate operation was advised and the patient was returned to the hospital in an almost comatose condition.

Under chloroform anesthesia, an incision was made in the line of the old scar behind the ear, and both flaps retracted. The cavity of the old mastoid wound was cleared of all granulations, and of what appeared to be skin grafts, then thoroughly cleansed and explored. Necrotic bone was found over the tegmen tympani, and through this the probe led to dura. The mastoid tip was discolored and remained intact.

An incision was now made through the posterior flap at right angles to it and backward for about two inches. The mastoid tip was first ablated and the lateral sinus, which had been exposed by this procedure, was found to be discolored and collapsed. The sinus was removed from the bulb to

near the torcular end, before normal blood flow was established, and was then packed off by iodoform gauze.

Attention was now directed to the exposure of the tempero-sphenoidal lobe. An opening about the size of a 50-cent piece was made through the bone at the usual site for such exploration, and disclosed a slightly congested dura. Three silk sutures were introduced through the dura and a horizontal incision of about an inch and a quarter was made over them, dividing the dura. There was but slight intracranial pressure. A long thin-bladed knife was then introduced into the brain substance in a direction forward, inward and upward, but no pus followed the knife. A second puncture forward, inward and downward was immediately followed by the discharge of a quantity of thin yellow odorless pus. A Whiting encephaloscope was carefully introduced and a large abscess cavity, having no lining wall and filled with pus and necrotic brain tissue, was found.

After this cavity had been wiped clean, a cigarette drain composed of gauze saturated with equal parts of powdered boric acid and iodoform, was inserted. The silk sutures in the dura were removed and the usual dressings were applied. About one ounce of pus escaped from this abscess cavity, and the laboratory report showed the infection to be due to staphylococcus albus.

On the third day following operation, the aphasia and the nausea had disappeared, the patient was able to retain some nourishment, the pulse was stronger and the temperature had come down to 99. From this time on, the boy gained daily, the pulse rate increased to 88, while the headaches had entirely disappeared and appetite had returned.

The entire wound was dressed daily, especial care being taken in the manipulation of the brain cavity from which all packing was removed on August 17th—the 25th day after operation.

The boy was discharged from the hospital on September 5th, practically cured. Six differential blood counts from this patient were made between July 5th and August 16th, and they show positively the onset, the crisis and the decline of this secondary infective process.

They are as follows:

July 5—Red cells,		5,000,000
	Leucocytes,	12,600
	Polynuclear cells,	66%
July 10—Red cells,		4,840,000
	Leucocytes,	10,600
	Polynuclear cells,	61.26%
July 22—Red cells,		4,656,000
	Leucocytes,	15,100
	Polynuclear cells,	76.75%
July 23—Red cells,		4,500,000
	Leucocytes,	15,000
	Polynuclear,	83%
July 30—Red cells,		3,056,000
	Leucocytes,	6,010
	Polynuclear cells,	61.8%
August 16—Red cells,		3,230,000
	Leucocytes,	6,000
	Polynuclear cells,	52.8%

It will be noticed that in the blood counts taken on July 5th and 10th, the leucocytosis was rather high, and this was due undoubtedly to the effort at healing, but on both these the polynuclear percentage was normal.

In the blood counts of July 22d and 23d, we find a relatively high leucocytosis and rapidly increasing septic invasion, as shown by the polynuclear percentages for those dates.

Again, the blood examination of July 30th and August 16th, show a return to normal conditions. In this case, all the clinical symptoms pointed certainly to a brain infection.

The polynuclear examinations gave us a relatively higher percentage as time passed, confirming our diagnosis of a new pus formation and the increasing severity of the infection, and warned us clearly of the time for operative interference, while our leucocyte count kept us informed as to the bodily resistance of the patient. Valuable information, indeed, and clinical medicine and laboratory were in thorough accord in this case.

In contrast to this picture, allow me to report:

Case No. 2—On the evening of December 23, 1905, I saw, in consultation, M. H., a boy 12 years of age. He had been suffering from a cold for a week, and for the last two nights had complained of such severe pain in both ears that sleep

had been impossible.

The boy was extremely nervous and was suffering intensely. The temperature, by mouth, was 103°, the pulse was 122 and of fair volume.

On aural examination of the right ear, the posterior superior canal wall was found to be bulging, highly injected, and prolapsed so that the drum membrane could not be made out, and there was no discharge present in the external auditory canal. The slightest pressure over the right mastoid antrum caused intense pain, and there was likewise some tip tenderness. Movement of the cartilaginous canal elicited no pain.

In the left ear, the speculum revealed practically the same conditions, although not quite so marked, while pressure over the bone developed tenderness over the left antrum and tip.

The patient was taken to the New York Eye and Ear Infirmary, and under nitrous oxid anesthesia, myringotomy was done on the right side. A specimen of the discharge which followed the incision was sent to the laboratory for examination. A bichlorid solution of a strength 1 to 5000 was ordered for aural irrigation every two hours, the patient was put to bed, a cathartic was given and fluid diet ordered. The boy slept fairly well that night, but the pain increasing in the left ear on the following day, it became necessary to incise the left drum membrane. A very purulent discharge followed this incision, and a specimen was taken for examination.

The report from the laboratory showed that streptococci were present in large numbers in both smears, and it may be stated here that the same report was returned from the laboratory on the smears, taken for the eight days following.

The patient slept fairly well after free drainage had been established, but the antrum pain was exaggerated on both sides and the temperature remained high, 102°.

On December 26th, the first differential blood count was made, and confirmed my opinion that an operation was imperative.

On the two following days—December 27th and 28th—the clinical symptoms did not improve and the polynuclear percentages increased, but having my patient under perfect control and determining to test fully the value of the blood

count, I decided to postpone operation. All preparations were made, however, for an operation on December 29th, as I expected the next differential count would show still further polynuclear increase, but, to my surprise, despite the severity of the clinical symptoms, the polynuclear percentage fell from 77 to 65.9 per cent, and the operation was again postponed.

On December 31st, all the local symptoms began slowly to clear up, the general condition improved and the mastoid tenderness began gradually to disappear. The temperature, which during the week, had been fluctuating daily between normal and 102.5°, a typical septic curve, fell to almost normal, and the patient was discharged from the hospital, without operation, on January 6th, 1906. Both ears still discharged.

The following are the results of the leucocyte counts:

December 26—	Red cells,	5,010,000
	Leucocytes,	19,400
	Polynuclear cells,	71.8%
December 27—	Red cells,	5,000,000
	Leucocytes,	19,500
	Polynuclear cells,	75.%
December 28—	Red cells,	4,980,000
	Leucocytes,	16,000
	Polynuclear cells,	77.5%
December 29—	Red cells,	4,970,000
	Leucocytes,	13,000
	Polynuclear cells,	65.9%
December 31—	Red cells,	4,600,000
	Leucocytes,	11,700
	Polynuclear cells,	68.8%

In examining these blood counts, it will be observed that the patient had an increasingly high polynuclear percentage and a fairly high leucocytosis for the first three days in which specimens were taken, but the polynuclear percentage was not high enough to warrant surgical interference at any time, despite the clinical symptoms.

Here, indeed, we have beyond doubt from a clinical standpoint, a typical picture of acute double mastoiditis. Note, if you please, the period of aural involvement, the bulging and highly injected drum membrane, the prolapse of posterosuperior walls, the marked pain on slight pressure over both

antra and tips, the temperature, the character of the infection, the sleeplessness and the general hebitude.

The clinical picture and the laboratory were at marked variance in this case. But here the laboratory was right, and the patient made a complete recovery without any loss of function.

There are many objections to a laboratory diagnosis. I am well aware of the fact that there are those who strongly believe that, surgically speaking, they would much prefer to be sure of their ground from the viewpoint of a mastoid cavity than to leave by any chance a focus of infection which may need later on a more serious surgical operation, and it must be confessed that the position is well taken.

Again, John B. Deaver, in the *Medical News*, 1902, warns us thus:

"In the last few years there has crept into the profession the tendency to replace the bedside by the laboratory as a point from which to make a diagnosis. This we regret, for in the majority of instances, the diagnosis must be made at the bedside without the aid of the microscopist, and any man who has no confidence in diagnosis made without the aid of the laboratory, limits his usefulness."

It must be also borne in mind, that we may have to deal with acute infective cases which bear a fair analogy to the acute fulminating types of appendicitis where, to put it roughly, the blood is practically overwhelmed for the time by the inroad of the toxins and there is no blood reaction. In cases of this type, there may be no hypoleucocytosis, but we will invariably find even here a relatively high polynuclear percentage.

Again, only competent men should make a blood count in order that all sources of error may be eliminated through technical skill. One can easily see where faulty technic either in taking the specimen or in staining it, may be responsible for a wide variance in tests which may result seriously.

In searching for laboratory evidences of pus formation in or about the ear, in our acute cases, we must not forget, too, that a relatively high polynuclear percentage may indicate pus elsewhere in the body, or that in certain diseases—scarlet fever, erysipelas and pneumonia—these same high polynuclear percentages may exist, and that the disease itself may be the principal factor in the blood changes and the aural condition

only an insignificant complication. A process of elimination is often necessary if such conditions are present.

On the other hand, a sraightforward, simple scientific fact should be trusted, despite the fact that it occasionally clashes with clinical medicine. I used the word "fact" advisedly in reference to differential blood examinations, because in not one instance, so Sondern declares, where such a count has been made correctly, has there been a failure to reveal pus where pus was present. As I said at the beginning of this paper, however, these two cases are simply illustrative and instructive.

In conclusion, I would say, that in every acute infective case where we have the patient under perfect control, and where a differential blood count can be readily obtained at the hands of a competent examiner, it is our plain duty to the patient and to ourselves as well, that such an examination should be made.

Moreover, in the light of recent investigation, we must be especially careful to place more emphasis on the relative polynuclear percentages than on a hypoleucocytosis, which, while interesting from a certain standpoint, does not indicate a pus formation or measure the severity of infection.

III.

REPORT OF A CASE OF DEFORMITY OF THE NOSE RESULTING FROM LUPUS; CORRECTED BY THE SUBCUTANEOUS METHOD.

By John O. Roe, M. D.,

ROCHESTER.

The following case of lupus of the nose is of interest on account of (1) the successful arrest of the disease after extensive destruction of tissue; (2) the marked deformity of the nose resulting from this loss of tissue and the cicatricial contraction; and (3) the subsequent successful subcutaneous correction of this deformity by the plastic method.

Mrs. E. A., of Minnesota, was referred to me by her family physician, November 27th, 1905, for the correction of her nasal deformity.

The history of the case is briefly as follows: Ten years ago she was attacked with lupus, the disease appearing at the same time on the face and on the right wrist. On the face the ulceration began as a patch under the right eye; later it extended to the lower portion of the nose and left cheek.

On the face and on the wrist the ulceration was superficial, confined entirely to the skin, but about the nose it extended deeply, involving the subcutaneous connective tissue, eating away a large portion around the end, extending up the sides, excavating both alae and giving the nose the appearance as if a portion had been literally bitten away by a wolf. The disease also extended into the nose, destroying the triangular cartilage.

The patient had been treated by her local physician with iodin and external cauterization, but without avail. She was then sent to Dr. Charles H. Mayo, of Rochester, Minn., who succeeded in arresting the disease by internal medication, consisting mainly, I believe, of guaiacol. After a considerable period the disease was arrested and, at the end of two years, entirely healed.

Two years later the patient was operated upon by a distinguished surgeon for the correction of the nasal deformity resulting from the lupus.

Under ether the doctor attempted to correct this deformity by a plastic operation, but was unsuccessful, the result being the complete obstruction of both nostrils, when cicatrization had taken place. Previous to this time she was able to breathe fairly well through her nose, but at the time I saw her both

Fig. 1.

nostrils were almost completely impervious to air, the only external communication being by a very small opening on the left side, near the upper part of the columna, through which a very slender probe could be passed.

On examination of the nose the end was seen to be cone-shaped, projecting downward, as shown in Figs. 1 and 2. There was a V-shaped contraction of the left ala, and a somewhat rounded contraction of the right ala, as seen in the illustrations. The triangular cartilage of the septum was

gone; the turbinates were small and the interior of the nose was quite capacious. The bony framework of the nose was normal. There was considerable scarring of the face where the lupus had attacked the skin (which may be seen in the illustrations).

In the correction of this deformity but one ala was operated upon at a time, the first operation being performed upon the right side. In performing this operation, a vertical incision

Fig. 2.

was first made so as to leave the central portion, the columna, of the normal width. The skin was then raised or dissected up, the incision being made on the inside of the nostril, to above the rounded mass of cicatricial tissue, on the right side of the nose, as shown in Figs. 1 and 2. A subcutaneous flap was then made of this mass of tissue which was turned down so as to fill in the defective portion and to form the normal contour of the ala. The skin was then sufficiently loosened to permit

it to be brought down or to slide down over this transplanted tissue, and permit the edge to be turned so as to form the border of the ala, and also to cover the denuded portion on the inside, in order that there should not be two opposing raw surfaces. The parts were carefully stitched in place, and an aluminum nasal tube introduced into the nostril, so as to maintain the normal size and shape until healed. When this side was

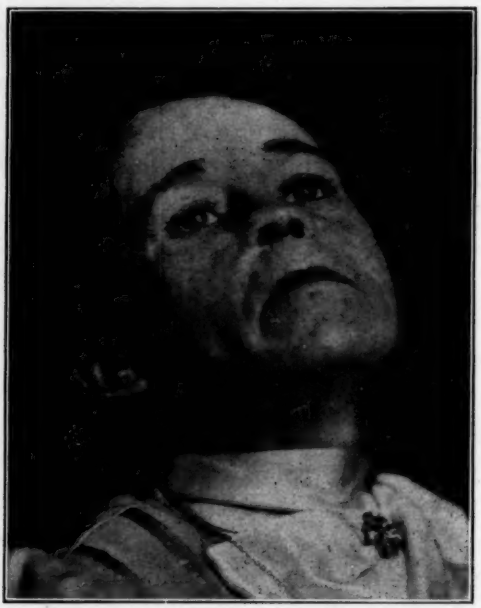

Fig. 3.

sufficiently healed the other side was operated upon in a similar manner, varied only by the slightly different conditions on this side, the redundant tissue at the end being utilized to fill in the gap in the left ala. After the skin had been raised, a flap was made of the redundant tissue in the end of the nose which was turned in to the gap in the left side, filling it completely.

A tube was also introduced into this nostril, and both tubes worn until healing was complete, leaving the nostrils in quite a normal condition, as will be seen by the Figs. 3 and 4, which show the condition of the nose after the operation. Two additional minor operations were necessary to remove inequalities

Fig. 4.

resulting from uneven healing, in addition to the careful and minute attention to details that were necessary until the work was completed.

The result in this case, it is needless to say, is gratifying both to the patient and to myself, and on her part was about equally divided between the wonderfully improved appearance of her nose, and her ability to breathe through it, which she had been unable to do for six years.

I expected to be able to present the patient for your inspection, but she was, I am sorry to say, called home last week.

This was a little earlier that I wished her to go, as I wanted to be sure of the complete and symmetrical healing of the tissues before she left.

From later reports, received since this paper was read, I learn that, by the patient's wearing the tubes until all tendency to contraction of the tissues about the nostrils had entirely disappeared, the result has proved entirely satisfactory.

IV.

TRYPSIN TREATMENT OF A CASE OF MALIGNANT DISEASE, INVOLVING THE LEFT TONSIL, BASE OF TONGUE AND EPIGLOTTIS.*

By James T. Campbell, M. D.,

PROFESSOR OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY IN THE POST GRADUATE MEDICAL SCHOOL, CHICAGO.

Von Bergman states (1) that cancer of the stomach stops abruptly and sharply at the pylorus, that the small intestine is but rarely the site of cancer and that cancer of the large intestine and rectum for the most part increases in frequency the further the distance from the duodenum. In 10537 cases of cancer of the alimentary tract, the stomach was involved 4238 times, the small intestines 20, the large intestines 224, the rectum 1204 times. Considering the natural and comparative immunity of the duodenum and small intestines, and the slow rate of growth of cancer of the large intestine, it would appear that the theoretical treatment of inoperable cancer by preparations of the pancreas, bile salts, intestinal gland extracts and ferments (alone or combined), is readily supported. Pancreatic extracts, according to Vernon (2), contain two independent ferments, namely: pancreatic erepsin which does not exist in the form of a soluble zymogen and trypsin which does. Of the peptone-splitting effected by pancreatic ferments the larger part is due to pancreatic erepsin, a ferment quite different from trypsin and from intestinal erepsin.

In November, 1905, through the solicitation of Dr. J. Beard (3), lecturer in comparative embryology in the University of Edinburg, Dr. Wade began experiments to ascertain the action of trypsin upon the living cells of a carcinoma, such as Jensen's mouse tumor (an adenoma-carcinoma); to test the truth of the conclusion advanced by Beard (4) in 1902 that cancer was an irresponsible trophoblast; and to determine the length

*Read before the Chicago Laryngological and Otological Society, December 11, 1906.

of treatment and number of trypsin injections necessary to destroy the tumor. Eight mice were selected with well-developed Jensen's mouse tumor. Two were treated with trypsin and the others were used as controls. On the tenth day, during which time four injections had been made, one mouse died, but post-mortem revealed no cause of death. Upon microscopic examination all the cells of the tumor were in degeneration, fully half of them being represented by shapeless masses of particles which were probably the remains of nuclei, the rest were mere skeletons of cells. The somatic tissues of the mouse, as represented by the leucocytes and connective-tissue stroma cells were quite normal.

The other trypsin mouse was given nine injections in 22 days and then was killed to make comparison with a control mouse which had died of its tumor on that day. In the case of the control mouse the tumor was as large as the terminal phalanx of a man's thumb, but in that of the second trypsin mouse it was only the size of a lentil. Microscopically it was in advanced degeneration.

It is certain that the action of trypsin upon the cancer cell is to overcome the cancer albumin—a living substance—and thereby destroy the cancer ferment, malignin. In the cancer ferment, malignin, and in trypsin we have an antithesis of ferments, of which the latter is the more powerful.

Bashford (5) compares the identity of the sporadic malignant new growths of the mouse in all their anatomic features, with those of man, and the reproduction of the gross morbid anatomy of malignant disease as met with in the human subject, with the artificially propagated cancer of the mouse. It seems reasonable to believe that if trypsin injection destroys cancer cells in the mice, it may be employed with equal success to cure cancer in the human being.

Shaw-Mackenzie (6) says that repeated observations in cases of trypsin treatment have convinced him that shrinkage of the growth occurs simultaneously with relief of pain and unequivocal improvement in appetite, general nutrition and weight. In greatly advanced and hopeless cases it should be clearly understood that only relief from pain is to be expected.

Beard (7) advises giving injectio trypsini (Fairchild Bros. & Foster) in small amounts well diluted for a few preliminary injections. Then injectio trypsini daily up to two ampoules for three or four weeks. One ampoule on a certain day fol-

lowed by an ampoule of injectio amylopsini on the next day, and so on alternately for another period of four weeks. Lastly, one or perhaps two ampoules injectio amylopsini daily for about four weeks or longer, as the case may require. The injectio amylopsini follows the injectio trypsini in the latter period of the treatment and meets even from the start, any bad symptoms, such as nausea, vomiting, pain in the back, drowsiness, albuminuria, high arterial tension, edema, etc.

Should the trypsin injections still be not well borne, the quantity should be still further diluted and given more frequently, the daily amount being thereby undiminished. It is easy enough to kill every cell of a cancer with injections of trypsin, but for its removal and to prevent the formation of poisonous products from its degeneration, injections of the diastatic ferment of the pancreas gland amylopsini are absolutely necessary.

Dr. William J. Morton (8) reports 29 far advanced, practically hopeless and inoperable cases, about half of which were subjected to X-ray treatment, although to trypsin injection he attributes the marked benefits derived. Two cases of face cancer were cured and in all the cases signs of amelioration in the progress of the disease were observed, with improvement in the general health. Hemorrhages ceased and pains were alleviated. It was noted that during the amylopsin treatment the patients expressed their feeling of greatest improvement.

Case Report—J. H., aged 56, hotel clerk, of good family history, has had gonorrhea, but denies having had syphilis. On September 1, 1905, the patient weighed 168 pounds and about that time complained of pain over the left side of the face, which later became more manifest along the left lower jaw, in the ear, and from occiput to the vertex. As the pain was unrelieved, he had five left lower and two back upper teeth extracted. He was treated at various hospitals and clinics until May 9, 1906, when I first saw him at the Post Graduate Hospital. At that time, he could not protrude his tongue and swallowed with much difficulty the smallest amount of liquid, impulsively placing his hand as though to support the lower jaw. His speech was thick and indistinct, he had left facial paralysis and complained of constant pain radiating over the face from the angle of the left jaw.

Examination.—An indurated mass was found at the left side and base of the tongue the size of a filbert, an indurated

enlarged firmly fixed left tonsil, a much thickened epiglottis and ulceration in the glosso-epiglottic sulcus of the left side. The submaxillary gland of the corresponding side was large, hard and adherent. At my request he was examined by Dr. T. Melville Hardie, Dr. George Morgenthau and Dr. Frederick Besley, all of whom pronounced the disease malignant, and the case inoperable.

General Treatment.—We prescribed large and increasing doses of potassium iodid. Ten days later he had a violent hemorrhage from the mouth and was taken in an ambulance to the Cook County Hospital, where he remained more than five weeks. While there mercurial inunctions were administered daily for three weeks. He returned to us on July 2, and was under observation in the Post Graduate Hospital for three weeks. Large doses of potassium iodid were given, and the leucodescent lamp applied as a placebo; yet his condition gradually grew worse. His weight was reduced to 115 pounds and he was taking about four grains of morphin daily to allay the pain. As the patient was failing rapidly and nothing better could be suggested, we determined to try trypsin injections.

Trypsin Treatment.—August 25, 1906, five minims of Fairchild Bros. & Foster injectio trypsini, 3 per cent solution, diluted with ten minims of sterilized water, were injected under the skin over the enlarged gland, and on August 28 ten minims were injected in the same region. August 31 and on September 4 fifteen minims were injected, and we noticed that the swollen submaxillary gland, which had enlarged to the size of a hen's egg, during the course of one night just prior to the beginning of trypsin injection, was very rapidly decreasing in size. He was swallowing more comfortably and feeling so much better that he celebrated his improvement by indulging in a ten-day spree. September 16th, 20 minims (one ampoule) were injected and since that time one ampoule of injectio trypsini diluted with two volumes of distilled water has been injected under the skin of the buttocks each alternate day. September 18th, he weighed 123 pounds, and September 20th, 126 pounds (a gain of three pounds in two days), and he has taken but one-half grain of morphin in these two days. He drinks two quarts of milk daily in addition to a diet of eggs, oysters, beef, mutton, cereals, etc. At the present time his weight is 133½ pounds. He has little or no pain and is taking

no opiate. His color is good, tongue fairly clean, the infiltrations in the tongue, tonsil, epiglottis and submaxillary region have greatly decreased. He says that he feels well and believes himself cured. For a week past, injectio amylopsini has been given each alternate day.

Unfortunately, our early diagnosis was clinical only. Recently I removed sections from the tonsil and the laboratory diagnosis by Professor Zeit was pronounced "infective granulomata." As infective granulomata include tubercle, lupus, syphilis, glanders and farcy, leprosy and actinomycosis, with out going into details I think we may exclude all except syphilis and tubercle. He denies ever having had a chancre, he never had secondary manifestations of syphilis, the infiltrations never broke down, they maintained their stony hardness under persistent antisyphilitic treatment. Against tubercle, no tubercle bacilli nor giant cells were found in the microscopic section; he has not the characteristic pallor of mucous membrane found in tuberculosis. There is no pulmonary involvement. My belief is that the growths are carcinomatous, that what improvement has been brought about is entirely due to trypsin, and that the granular cells found by Professor Zeit are degenerated cancer cells.

In conclusion, I wish to express my indebtedness to Dr. Hugh A. Cuthbertson to whose painstaking efforts this patient's improvement is due.

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V.

THE CONSERVATION OF HEARING IN OPERATIONS ON THE MASTOID REGION.*

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The amount of residual hearing following the various kinds of mastoid operations depends, (1) on the integrity of the sound perceiving mechanism; (2) on the amount of the sound conducting mechanism left by the disease; (3) upon the functional efficacy of this conducting mechanism; (4) upon the amount of the conducting mechanism remaining after the operation; and (5) upon the functional efficacy of the sound conducting mechanism remaining after the operation.

The first three conditions require no discussion. The fourth condition is fundamentally a question of the amount of destruction which the disease has caused, while secondarily and practically it is a question of how much of the mechanism the surgeon will be able to save? It is far easier for him to attack the tympanic contents indiscriminately, or make a clean sweep of everything in the tympanum, taking the healthy with the diseased structures, and to use the probe unrestrained by consideration of its effect upon the acoustic balance, than to save the parts of the conducting mechanism which the disease has not seriously injured and avoid touching or dislocating them.

When the simple mastoid operation is sufficient to fulfill the surgical requirement, the operator can conserve the ossicular chain intact if he is content to stay his hand at the aditus ad antrum, nor let his curiosity carry his probe as far as the incus. The surgeon who is about to perform a tympanomastoid operation can serve the interests of the patient and preserve an important fraction of hearing if he will spend a few minutes previous to operation and examine the tympanum through the meatus in order to locate the structures which are not sufficiently diseased to require removal, such as the stapes

*Read at the meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society, January 5, 1907.

and neighboring portions of the drum membrane, and in some cases the whole ossicular chain. In the cases where something more than a simple mastoid operation is required, the middle ear may need to be encroached upon more or less and some unavoidable injury must necessarily befall the sound conducting mechanism. There is a great difference in the effect on the residual hearing if the major ossicles and stapes are removed or dislocated in whole or in part, or if they are preserved in position.

The fifth condition on which the maximum of residual hearing depends, namely, the functional efficacy of the remaining portion of the sound conducting mechanism, is capable of much amelioration if the ossicles are preserved in position without dislocation and if careful consideration is given to the action, deficiencies and needs of the conducting mechanism in the individual case. Just as in cutting off a leg there is a point of election, so too in the middle ear. In the middle ear certain portions of the structure should be saved together, and certain others removed together. It is important for the middle ear, as well as for a leg, to have a stump that can readily be fitted with a mechanical appliance. An artificial drum membrane is of great post-operative service when a suitable stump has been left.

There are five rules to guide us in disposal of the tympanic structures: (1) The tympanum should be restored to its normal condition with nothing taken away if the malleus is left. (2) The incus should be removed if the malleus is out, because the incus acts as a damper of the stapes. (3) The posterior attachments of the membrane should be preserved after loss of the malleus and incus, because this part of the membrane can be trained on to the stapes and act as a sound transmitter for it. (4) The tympanum should be kept open when the malleus and incus are gone, in order that the sonorous oscillation may infringe on the fenestrae and promontory with the least loss of intensity. The anterior attachments of the membrana tympani should then be preserved and this part of the membrane trained across the ostium tympanicum tubae to close it and prevent infection reaching the middle ear from the pharynx. (5) The tympanum should be kept open and the major ossicles removed if the stapes is out, to allow the freest access of sound waves to the labyrinth.

Careful examination of a large number of cases has shown

us that the common hindrances to maximum transmission of sound are due either to unnecessary dislocation caused in the operation, to fixation of oscillating parts by cicatricial tissue, or to the dampening of the fenestrae. All these obstacles are usually combined. Cicatrices are the most easily demonstrated cause of reduced residual hearing. When the cicatrices are least in thickness or density, or, what is the same thing, when the tympanum approaches closest to normal in regard to the covering of the ossicles, ligamentous parts and fenestrae, the best hearing is obtained. The acuteness of hearing is also in proportion to the integrity of the ossicular chain. The more that is kept of this, the better the result. The preservation of all the finger tissue possible in the treatment of injured hands is of great importance to the later usefulness of the member. The same might be said of the ossicular chain, —that all the ossicular tissue possible should be preserved, even a small stump of the malleus is valuable.

We found that the cases with the best hearing were those which had the shortest tympanic convalescence, other things being equal, while those with the poorest residual hearing were the cases which had gone through a lingering tympanic convalescence.

The rapid restoration of the tympanum together with its function can sometimes be facilitated by allowing the membrane to heal up quickly, while drainage is kept up in some other direction as long as it is required. The necessary drainage may be obtained through the Eustachian tube, the mastoid wound, or best of all, because there is no disfigurement, through an opening in the posterior membranous wall of the canal just external to the annulus. This method or drainage requires extensive removal of the posterior osseous wall. After the complete radical operation the tympanic drainage through the meatus is perfect.

The use of skin grafts in the tympano-mastoid operations does not seem to lessen the amount of dense tissues covering the stapes.

The following cases are mentioned with the intention of showing the methods employed to secure the best conditions for the preservation of hearing.

First Case.—A simple mastoid operation with epidural complications on a girl 16 years old. Middle ear was not attacked at the operation except by a very extensive myringotomy. Mid-

dle ear dry on the fourth day after operation, watch heard 20 inches. On the tenth day the membrana tympani was completely healed and the watch was heard 4 feet; six months later the watch was heard 8½ feet.

Second Case.—A modified tympano-mastoid operation was performed for recurrent mastoiditis and otorrhea on a lad of 17. The tympanum was invaded from behind, above, and through the membrane as far as it was possible to go without dislocation of the ossicles. On the fifth day after the operation the middle ear was dry; on the tenth day the membrana tympani was completely healed; on the fifteenth day, watch was heard 13 inches; ten months after the operation watch was heard 6½ feet.*

Third Case.—Tympano-mastoid operation for chronic middle ear suppuration and tympanic caries. Woman, age 24. None of the ossicles present at time of operation. No skin graft used. On the twenty-second day after the operation the tympanum was dry and epidermitized. Two years and three months after operation, watch heard 10 inches.

Fourth Case.—A very slow mastoid convalescence with comparatively good hearing. Man, age 77. O. M. P. C., left, perforation of membrane, mastoiditis, osteomyelitis and scattered pus foci; operation uncovered dura of middle fossa and knee of sinus. Posterior wall of canal extensively removed, membranous canal perforated posteriorly. Mastoid wound sutured around small drain, no packing. Fourth day wound closed by first intention. Abundant serous discharge from the meatal opening. The wound within filled up very slowly, discharging serum through the fistula in canal. Did not suppurate. Thirty-ninth day, fistula in canal finally closed. Acumeter O. S. 7 inches, O. D. 4 inches. Eighty-first day, watch heard 10 inches from the left ear.

Conclusion.—The maximum post-operative hearing is obtained by judicious preservation of the sound conducting mechanism, and by the most rapid possible convalescence of the middle ear.

***The writer performed his first operation of this kind at the New York Eye and Ear Infirmary, July 29, 1905, and therefore claims precedence in this procedure.**

VI.

ROUTINE NASOPHARYNGEAL EXAMINATION IN THE PREPARATORY SCHOOL.

By James A. Babbitt, M. D.,

PHILADELPHIA.

Almost startling strides have been made in the past few years in routine precautionary oversight of school children. Each successive administration inaugurates some new system of medical and hygienic supervision. Boards of civic and educational control, corporations, municipal and private institutions, manufactories and large business houses—nearly all have definite methods for periodically reviewing physical conditions of the men, women and children under their supervision.

In every case the principal involved lies in the time-worn adage "prevention is better than cure," prevention not only concerned in the welfare of the individual, but also in the welfare of those surrounding them.

The purpose and indication for routine care in the preparatory schools rest upon the fact that as well in special senses as in general conditions, numerous fundamental conditions of defect exist, and at this stage of life their effect upon general body metabolism and co-ordination may be functional rather than organic.

It will be generally admitted that defects, obstructive and otherwise, in the nasopharyngeal region affect the general system, and that at the preparatory school period, each such discovered, with subsequent recommendation for relief, is of paramount importance to the school boy's condition.

With our modern acceptation of infectious theories, it is of no less importance to proect the boy's companions in study than himself.

Chronic follicular infections of the tonsil, the discharge of a suppurative otitis media (for the ear belongs to the throat group), mucopurulent sinus discharge—all these present a positive danger in the close contact of school boy life.

On the other hand certain difficulties in examination present themselves and their consideration is but fair. First of all comes the conflict with school time schedule. If the tests and examination include chart reading for sight and tuning-forks for ear in complete review and also require condensed-light reflection, the boy must be excused directly from all class room work to report at proper office, or the work done by special outside appointment, which is at the best unsatisfactory. This conflict, however, with curriculum, after all but slight, holds little weight with the cautious master who sees the importance in special sense protection.

The next obstacle may be both subjective and objective, the former dependent upon the boy's unwillingness to appear for any such examination and objective on the part of his parents or local physician. Such objection rests upon careless estimation of the importance attached to this department coupled with a selfish resistance to disturbance of individual prerogative, and on the part of certain family physicians to consider such regulation a slight upon their family supervision.

Finally by way of caution must be considered the danger of magnifying conditions of minor importance, and stimulating by suggestion processes primarily but simple.

In spite of the above limitations we unanimously decide upon the examination and now what simple method can be suggested for making a reasonably thorough examination of ear, nose and throat and consistent with school surroundings?

After selecting the time period most suited to the class under review, it is well to have boys report in primary group of three, each boy as he returns sending another out. This enables the exchange to be accomplished without appreciable loss of time for the examiner, and by allowing each boy to observe at least one previous test, relieves the necessity of reassuring the smaller and timid lads, and the delay from taking awkward positions.

In the examining room should be arranged condensed light, bowl of antiseptic solution in which to cleanse instruments between tests, two or three ear speculums with obtunded edges, tuning fork of two hundred vibrations, and it may be well to have Galton's whistle and otoscope accessibly near for special cases. Good, comfortable nasal metallic or hard rubber speculums should also be provided, and wooden tongue depressors. In addition throat mirrors, sizes one and four, for nasopharyn-

geal and laryngeal examination when indicated. While one boy is under inspection, the recording assistant should obtain all data possible as to previous history, localized headaches, catarrhal troubles, former earaches and discharge from any focus. History of former operations in this region should also be ascertained from the subject examined.

In routine examination we suggest the following system: First, by inspection and palpation, note conditions of glands, deflection of external contour of nose, or any bulging in mastoid region, evidence of operation, appearance of any discharge, condition and formation of teeth, and any habitual cephalic posture.

This examination might well be made during conversation which would both suggest any vocal disturbance and by distracting the boy's attention, prevent unnatural position.

In order to relieve any timidity, we would suggest beginning the examination with the ears, first noting condition of the auricle externally, then inspecting canal for obstruction and discharge, and finally with aural speculum whose size has been indicated during these preliminary steps, studying appearance and condition of tympanic membrane. While such tests with boys are unsatisfactory, it would be well to make simple tuning fork trials on either side, and if by this time examination or history has elucidated further evidence, more minute examination may follow.

The examination of the nares, next in order, reveals condition of the septum, turbinates and nasal floor, with character of discharge if any be present, and in all probability proves the presence of adenoid enlargement. This brings us to the most disagreeable part of the test in the lad's estimate, that of the mouth and pharyngeal chamber.

By using a comfortable tongue depressor with slight but firm pressure and careful adjustment, the entire wall can be fairly well viewed, and a surprisingly large number of cases will admit a good view of the pharyngeal vault and larynx by mirror if needed. In this examination size and condition of the faucial and lingual tonsils and evidence as to any enlargement likely to affect the Eustachian tubes should be carefully noted.

In cases of follicular tonsillitis or ulcerated mucous membrane, we have sufficient evidence in investigating further systemic conditions.

Laborious and painstaking though this examination may appear it really occupies but a few moments, provided proper arrangement of chairs and adjustment of light be effected.

By adopting such system of routine care what results have been obtained? First among defects we find a preponderance of "mouth breathers." but it would be ridiculous before this body to enumerate the cases of enlarged pharyngeal tonsil overlooked by the family physicians. Frequent as this condition is and serious in its effects upon the general system, other conditions of no less importance are sufficiently numerous. Old suppurative conditions of the ear perhaps with but very slight discharge and with only initial effect upon mastoid cells, may be found and placed under proper direction and care. Old infected foci in the tonsils, of themselves not seriously important may be sufficiently advanced to influence metabolism. Bony malformations in the nose, old sinusitis discharge, catarrhal changes in the larynx, each in turn may be remediable under prompt treatment.

In brief, the advantages to be derived from this careful supervision are to the individual, the school and the community. To the individual in the discovery of hitherto unnoticed pathologic conditions—to the school in cultivating a spirit of special interest in the student's physical welfare, in revealing conditions more or less generally infective in their character, and in rationally explaining oftentimes obscure conditions of vasomotor inactivity and torpid mental reaction (sometimes profound impediments are found which may not only affect his subsequent educational care, but possibly remodel his future life)—to the community, first in the elimination of direct infection, and secondly in permitting the eradication of those subconscious effects produced by the constant proximity of physical weakness and deformity. Such simple conditions as the hoarse tone and nasal voice have an undefined though definite influence on surrounding students.

In making these examinations it will be well to emphasize again the necessity for cautious advance in this direction. We must consider the individual type before us, must discover as much as possible without the subject's notice, must carefully eliminate the possibility of autosuggestion and guard the effect of our examination upon the family and family physician.

We desire co-operation, not antagonism; we desire to cultivate a judicious oversight but not a weakening of the now

almost national sense of admiration for physical hardihood; we desire to produce health and not favor or suggest invalidism; therefore, it will be well to repeat the caution in our preface, and consider the individual type before us from his own standpoint and in relation to his home and family physician's care. One clear case discovered in each fifty referred with cautionary advice of definite character, amply repays the monotony of the system, and this wisely directed special examination in the preparatory school should result in a co-operative spirit from master to instructor of lowest form in rounding out the healthy, physically perfect American boy.

VII.

A METHOD OF FORMING A SKIN AND PERIOSTEAL FLAP IN TYMPANO-MASTOID EXENTERATION.

By E. M. Holmes, M. D.,

BOSTON.

The purpose of all operations upon the middle ear and mastoid area has been to obtain drainage for pathologic secretions, to remove diseased and abnormal tissue, and to open it for inspection and more positive diagnosis when some symptom or symptoms were present which might be due to a grave pathologic condition in the cranial cavity, the lateral sinus or the jugular vein.

From the time when only those cases, in which nature had gone so far as to burrow through the mastoid cells and cortex and produced a retro-auricular infection or abscess, were relieved by a Wilde's incision or similar procedure, the progress has always been in the line of a more extensive and thorough operation; and today nearly all aural surgeons are agreed that to obtain successful results all necrotic and diseased tissue must, so far as possible, be removed, all pockets and recesses which may harbor secretions must be avoided; and that the best method in any case is that which will thoroughly remove disease, give perfect drainage and favor a rapid convalescence with a final epidermization of all exposed surfaces.

To accomplish this many kinds of skin and periosteal flaps have been devised. The grafting of skin from other localities has also been extensively practiced. It is not my purpose in this paper to describe or to criticize all or any particular method of forming flaps in making skin grafts, nor is it seemingly possible to adopt any method which can be successfully used in all cases. What I wish is to describe a method which I adopted five years ago and one which, so far as I can learn, has not as yet been described.

The usual methods of procuring flaps are in some manner to form a tongue of skin from the mastoid area and carry it into

the mastoid wound or to form a flap from the inner portion of the auditory canal nourishing the same by retaining an attachment to the outer portion of canal. I use the inner superior posterior portion of the skin and periosteum of the canal and preserve its attachment to the periosteum covering the mastoid bone.

In performing this operation the post-auricular incision differs from that usually made in that the skin only is incised and that somewhat nearer the auricle, care being taken not to injure the periosteum. The anterior skin flap is dissected and carried

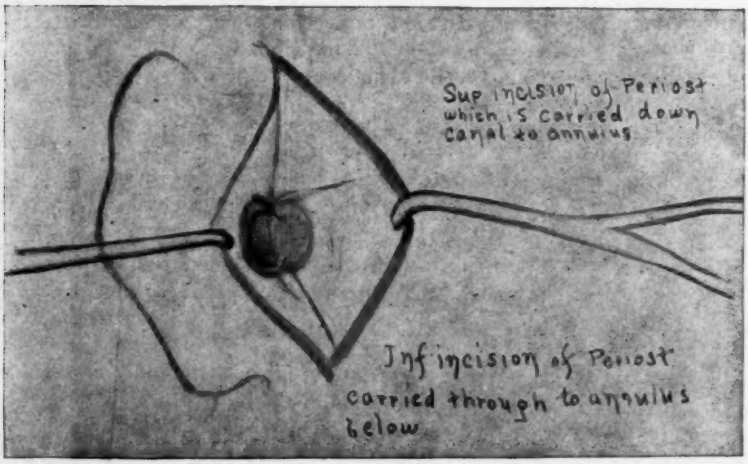

Fig. 1.

forward until the posterior and superior portion of the cartilage of the external auditory canal is exposed. An incision is now carried through the posterior and superior wall of the auditory canal and the auricle thus partially detached is carried forward. The anterior and inferior portions of the canal are not injured. With a semi-blunt knife and periosteal elevator which I have made, an incision is carried through the skin and periosteum of the bony canal from the incision already made beginning at the junction of the lower and middle third of the posterior wall extending to near the annulus, then by an upward course paral-

lel with annulus to junction of superior and anterior wall, then outward to rim of bony canal. From this the periosteum is incised over the linea temporalis as far back as to give ample exposure of bone. An incision is also carried through the periosteum from beginning of auricular incision below, backward and downward to posterior portion of mastoid tip.

Considerable care should now be exercised in removing the auricular skin flap so as not to injure that or its attachment to the post-mastoid periosteal flap. After this has been completed the mastoid portion is easily elevated with the usual instruments and the whole carried back and wrapped with gauze moistened with sterile normal salt solution. We have now a clear field for performing a radical mastoid operation, and after all diseased areas and pneumatic cells whether or not diseased have been removed, the bone is carefully smoothed so that there shall be as few uneven areas as possible, for it is important that the periosteal flap when replaced shall be in as perfect adjustment to the bone as possible. We have now to cleanse the wound and we cannot be too thorough. I have found that a sterile normal salt solution has given as good if not better results than any other. When we are sure that we have as far as possible removed everything which might act as a focus for infection the gauze can be removed from the flap of skin and periosteum which is now carried forward and adjusted.

Unless there has been very extensive disease this flap covers nearly all of the exposed bone, the attached portion of skin taken from auditory canal will now cover the area which was the aditus and attic of middle ear.

The next step is to adjust the auricle, and in order to prevent the tendency to produce a subsequent occlusion and to get sufficient room for subsequent treatment it seems well to split the posterior portion of the cartilaginous canal and then with gut suture the upper segment to periosteum over linea temporalis and the lower mastoid segment to that of the tip of the mastoid. The skin can now be closed and sutured and a small gauze pad so adjusted as to exert gentle pressure upon the mastoid thus keeping the periosteum in contact with the bone below and the skin above.

The auditory canal is now inspected and the skin flap adjusted if necessary, after which a gauze or gauze wrapped rubber tube is inserted to secure drainage from the middle ear.

The operation I have here described cannot always be carried out. A marked periosteal inflammation, a destruction of much of the periosteum, an extensive adhesion following simple mastoid operation, or spontaneous rupture may make it impossible to obtain a healthy skin flap. After making the first incision we can usually decide the question by inspection of the periosteum.

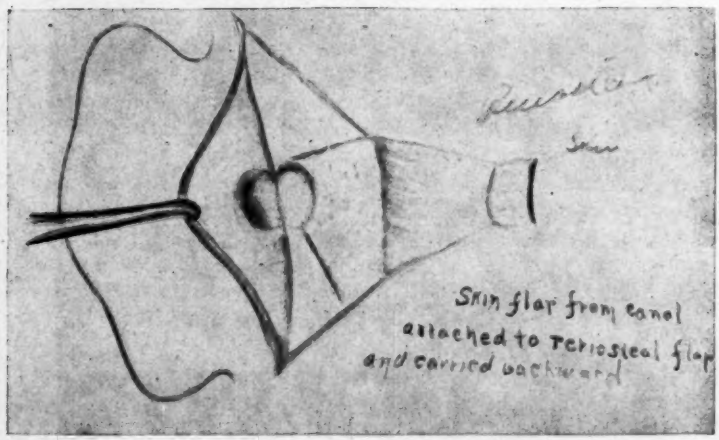

Fig. 2.

Again, it is not always good surgery to close the post-auricular wound, but the skin flap can be preserved even when the post-auricular wound is drained.

I have employed this method in 27 cases and have obtained excellent results in the majority, but as there is not space for a report of individual cases at this time I will shortly present another paper containing a record of all cases in which this operation has been performed.

VII.

OUR FAULTY METHODS OF BRAIN LOCALIZATION IN INTRACRANIAL LESIONS COMPLICATING AURAL DISEASES.*

By S. MacCuen Smith, M. D.,

PHILADELPHIA.

It is not my intention to treat the subject of intracranial complications in an exhaustive manner, but merely to bring it to your notice, with the hope that the discussion which follows will establish some points in differential diagnosis of brain lesions complicating aural disease.

In determining the presence and location of a brain tumor, where the patient's life is in no immediate danger, distinct localizing symptoms can be waited for, and a definite diagnosis can be deferred; but in a case of intracranial suppuration, in which a life may be saved by immediate action, or sacrificed by delay, we have an altogether different problem confronting us.

This extremely difficult question resolves itself into two parts:

First: Whether or not a cerebral abscess is present.

Second: What is its location?

A critical analysis of the manifold symptoms will usually enable us definitely to determine the former, but an accurate, unqualified answer to the latter is still extremely difficult, and in most instances, impossible of precise interpretation. Each succeeding generation has produced its investigators, profoundly learned and skilled in the dissecting room and at the autopsy, and yet, as Prof. Keen has pointed out, "fifteen years of experimentation (vivisection) have taught us more than the previous fifteen hundred years of careful observation and post-mortem examinations."

We must respectfully defer to those best qualified to deter-

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Soc., at Providence, Jan. 5, 1907.

mine the value of continued vivisection, in its relation to additional knowledge in exact brain localization. Judging, however, from the remarkable progress made in the recent past by those pursuing these scientific and humane investigations, it does not seem unreasonable to predict that the profession, in the near future, will be in possession of knowledge, the proper utilization of which will be the means of saving hundreds of valuable human lives, that today are being sacrificed unnecessarily, the anti-vivisectionists to the contrary notwithstanding. Only with such knowledge at our command will we be able to emulate the brilliant achievements accorded localization through the motor area.

We feel that we know something of the area presiding over sight, but much less of general sensation, hearing, smell and taste, while that controlling the intellect is still almost wholly in the dark. The establishment of invaluable, comprehensive facts regarding the motor area was made possible only by scientific experimentation, mostly on the lower animals. As conclusive proof that the results thus obtained have more than justified the methods employed, I have only to remind you of the brilliant achievements of the latter-day surgeon and his coworkers in motor localization and all that appertains thereto.

In uncomplicated cases our methods of localization are fairly accurate and can be relied upon in the majority of instances. Unfortunately, however, most of the patients coming under our observation present symptoms so complex, and therefore so unreliable and confusing, that we are often greatly perplexed in our efforts to locate the intracranial lesion accurately, and finally are compelled to arrive at a diagnosis by the process of exclusion, which frequently means little more than guesswork. This procedure, to say the least, is unscientific, and in some respects, reprehensible and unbecoming a learned profession.

It may justly be claimed that by personal intuition or some other occult power of reasoning, our success in locating and evacuating intracranial abscess formations so largely predominates that criticism of our failures, in view of recent advances made in this direction, is unfair. At the same time, in a patient presenting the symptom-complex, and these are the cases usually met with, we may select a point for operation without tangible, or at least convincing, proof of a correct diagnosis. The exigency of circumstances naturally impels such action,

and largely justifies this "hit-or-miss" practice, inasmuch as prompt evacuation of the pus offers the only possible means of relief. Other things being equal, the writer would select the temporo-sphenoidal region for operation, from the fact that he believes this locality most frequently involved, whereas another surgeon, for similar reasons, would select the cerebellum. It is possible, but unlikely, that both regions may be implicated. Should we fail to find pus in the locality primarily selected, it then becomes our duty to explore another, thus subjecting the patient to the shock and danger incident to two or more operations on the delicate structure of the brain. It is indeed true that under modern surgical practice and aseptic precautions, the brain will tolerate almost unlimited exploratory measures. Nevertheless we must remember that each minute particle probably has its own special function, and physiologically is so arranged that the functional harmony is unbalanced in direct proportion to the molecular disturbance, as well as by the locality involved. This is especially noticeable in the impaired mentality and other abnormal manifestations observed in some patients following operations on the brain.

We all recognize that pressure symptoms are made evident by headache, nausea and vomiting, vertigo toward the diseased side, mental and physical depression, marked lethargy, convulsions that may be attended with loss of consciousness, probably choked disc or optic neuritis, as well as reduced pulse rate and temperature. In a given case showing the above symptoms, especially when sudden in development and following a period of impaired health, we may be assured of the existence of an intracranial lesion. The point of vital importance is our ability to locate accurately the pus formation, since its prompt evacuation is the only means at our disposal offering relief. It is not sufficient to satisfy ourselves that a given region of the brain is involved, such as the cerebrum or cerebellum, but we should be able to designate definitely and finally the exact location of the lesion, as well as determine the amount of destruction incident thereto.

Bruhl points out that in a lesion of the third frontal convolution, on the left side, we find agraphia and alexia; in lesions of the first temporal convolution on the left, word deafness, crossed deafness, and anosmia; of the occipital lobe, optic aphasia and hemiopia. When the lesion is situated around the fissure of Rolando, epileptiform convulsions and crossed paralysis of

the extremities and facial paralysis are present. In lesions of the cerebellum, ataxia, vertigo, staggering gait, nystagmus, emaciation and rigidity of the muscles of the neck are manifested. These latter symptoms, taken in connection with the severe occipital pain increased by percussion, the marked vomiting, frequent yawning and extreme prostration, together with the flexed limbs and upturned face, would seem to be characteristic of cerebellar abscess.

However, I have seen cases operated upon for cerebellar abscess in which no pus was found, notwithstanding the fact that many of the above enumerated symptoms were present. In one case in particular, the post-mortem examination revealed the presence of non-infectious sinus thrombosis, the inflammatory condition extending to the meninges and brain tissue adjacent thereto. In this instance the symptoms showed that the lesion was located in the region of the cerebellum, but the interior of the cerebellar lobe was absolutely normal.

Briefly stated, the symptoms of brain abscess in general are as follows: Pain in the head is the earliest symptom, and at first is very severe, but later it becomes a steady, dull ache, and is present as long as the patient retains consciousness. It is increased if the cranium is percussed or pressure applied. At the beginning the patient has a high temperature, which soon drops to normal or subnormal, but in case of rupture, the absorption of toxin and the removal of pressure cause another sharp rise. When the temperature is highest, the pulse is usually rapid, but later it slows down and remains so until pressure is relieved by rupture of the abscess, when it again becomes rapid. Respirations are slow, deep and stertorous. There will be cerebral or reflex vomiting, i. e., emesis with a clean tongue, and not dependent on the ingestion of food. In the beginning, the only ocular symptom present will be photophobia, but later the pupil on the affected side becomes dilated and examination of the eyeground shows optic neuritis. Usually in advanced cases of brain abscess the patient is in a state of stupor, being hard to arouse, and only performs acts or answers questions after he has been spoken to several times, if indeed he can be aroused at all.

If the abscess is in the region of the Rolando fissure, certain muscular centers may be pressed upon, and thereby it manifests its presence in the form of Jacksonian epilepsy. But cerebral abscesses of otitic origin are seldom found in this region.

Their location is usually either in the temporo-sphenoidal lobe or in the cerebellum.

A great majority of these abscesses are found under what Barker calls the "dangerous area." This is within a circle having a radius of 1¼ inches, which has for its center a point 1¼ inches above and behind the external auditory meatus. They are often found not directly in contact with their source of infection, but with about an inch of healthy brain tissue intervening, this, of course, occurring when the infection is carried by the venous system.

It is sometimes noted that the local temperature is higher immediately over the seat of the abscess, even though the body temperature is subnormal. Macewen has found in some cases that in percussion of the head a higher note is elicited over the abscess than over the rest of the head.

A point of the greatest value, and one, furthermore, that explains the fatal termination of many cases that succumb after the pus has been evacuated, is the development of satellic abscess formations, arising from the parent abscess cavity. These foci are usually separated from each other by a thin wall of healthy brain tissue. Here again, accurate localization would enable us to determine definitely the situation of additional metastatic pus areas.

W. Milligan[1] states that "the occurrence of sensory aphasia is a symptom in cases in which a pathologic lesion is situated in the temporo-sphenoidal convolution; of motor aphasia, when the lesion is in the third left frontal convolution, or when pressure, say from an adjoining temporo-sphenoidal abscess, is exerted upon this center; of twitching paresis or paralysis of various methods or groups of muscles, when the cortical center which controls these muscles is interfered with, either as the result of an irritative and spreading meningitis or as the result of the pressure of a gradually increasing focus of suppuration." Hemiplegia signifies that the contents of the abscess press upon the internal capsule. Involvement of the third nerve is a symptom of temporo-sphenoidal abscess; sometimes the sixth nerve is involved in the same lesion. In cerebellar abscess we sometimes find optic neuritis followed by atrophy. An uncomplicated otitic cerebral lesion is not difficult to diagnose, but when one or more lesions occur together then symptoms of one overlap or mask those of the other.

Gradenigo[2] draws attention to the fact that encephalic abscess consecutive to purulent middle-ear otitides are situated either in the temporo-sphenoidal convolutions or in the lateral lobe of the cerebellum, and in both instances are near the diseased temporal bone. Up to the present time the same description of symptoms has been applied to the two kinds of abscesses. Nevertheless, the pathogenic, anatomic, and therapeutic differences that exist between the two forms of encephalic abscess justify a special description of each. Gradenigo then proceeds to describe the symptom of otitic cerebellar abscess: "Cerebellar abscess is less directly in relation with osseous lesions than cerebral lesions. Infection is conveyed to the cerebellum either by the sigmoid fossa or by the labyrinth through the internal auditory canal. With cerebral abscess there often co-exists sinus thrombosis or leptomeningitis. Differential diagnosis of these lesions is most difficult. Neither optic neuritis, lateral nystagmus, vertigo nor rigidity of the nucha is a special symptom of cerebellar abscess."

When blood counts were first made to determine the presence or absence of severe infection, leucocytosis was the all-governing factor, but more careful study, with numerous observations, has shown that a differential count must be made and that leucocytosis is more an index of body resistance to infection than of its severity.

For example, a person with good resistance may have marked leucocytosis as the result of a slight infection, and on the other hand, a person with impaired resistance may have little or no increase in the number of white cells with a very severe infection.

The relative number of polynuclear leucocytes is of the greatest significance in the determination of the presence of a purulent or gangrenous process. The normal percentage of these cells varies between 59 per cent and 68 per cent, with an average of about 61 per cent. If there is a relative count of less than 70 per cent, no pus need be suspected. Pus is not common with less than 80 per cent, except in children, where it has been found with a count as low as 73 per cent. About 93 per cent indicates a very severe process, and when it reaches 95 per cent, it may be considered almost fatal.

Fowler[3] cites two very interesting cases.

Case 1.—A young woman with serous otitis media had pain, rapid pulse, temperature, etc., indicative of acute mastoid dis-

ease, but as the polynuclear cells reached only 59 per cent, operative procedure was deferred and the patient recovered without operation.

Case 2.—A young man recovering from mastoid involvement as a result of an acute purulent otitis media, for which he had been operated upon, began to show evidence of meningeal irritation, with only slight inflammation, except that the polynuclear cells were up to 83 per cent. Operation disclosed a large abscess, and the patient subsequently died from meningitis. In both of these cases the percentage of polynuclear cells was accepted as an index for or against surgical interference.

From these observations we reach the following conclusions:

First.—A marked leucocytosis with a relative percentage of polynuclear cells below 70, shows slight infection with good resistance.

Second.—A marked leucocytosis with relative percentage of polynuclear cells above 80, shows severe infection with good body resistance.

Third.—Slight or absent leucocytosis, with relative percentage of polynuclear cells above 80, shows severe infection with impaired resistance.

An interesting contribution on this subject by McKernon[4] in which he reviews his findings in one hundred and sixty-six cases, confirms the value of the differential blood counts in septic cases.

I am indebted to Dr. J. Chalmers Da Costa for the following notes:

"That an abscess may cause focal symptoms is undoubtedly true, but in some regions it never does; and in some instances, when situated in a region in which one would expect it to be, it does not do so. The diagnosis may rest to a very large degree upon a history of the injury; the existence of some suppurating condition, particularly about the head or face; or the presence of some bacterial disease. When a person suffering with one of these conditions develops headache, slowed pulse, vomiting, irregular or subnormal temperature, and stupor, there is infection within the cranial cavity, which may be due to meningitis and may be due to abscess. If, in such a condition, there is evidence of localization of a process, the diagnosis of abscess is certain. Hence, focal symptoms should always be sought for, and are of the greatest possible value when found."

Abscess in or near the motor cortex may produce spasms, as a brain tumor does; but Mills points out that spasms are less frequent in abscess than in brain tumor, and even if present, do not have "such definite initial or signal symptoms." Of course the focal symptoms, if they exist, vary with the situation of the abscess, its size, the regions into which it passes, and its association with purulent meningitis.

In ear disease, the abscess is usually found in the temporo-sphenoidal lobe; and in that case it is occasionally found that there is loss of power on the opposite side of the body. This symptom may confuse us, and lead us to believe that an abscess is not in the temporo-sphenoidal lobe. When this condition is met with, it results from "pressure upon the fronto-parietal region, across the Sylvian fossa." (Mills.) An abscess in the temporal region of the left side may cause word-deafness or perhaps amnesic aphasia. So, too, the third nerve on the side of the abscess may occasionally exhibit the effects of pressure.

It is difficult, or impossible, to locate from symptoms the existence of an abscess in the frontal lobe. Abscess of the cerebellum may present definite cerebellar symptoms, and may induce focal symptoms; and it can readily be confused with tumor. If we are in doubt, and suppurative ear disease exists, the chance is in favor of abscess rather than of tumor; but if there has been an injury of the head, the chance is probably more in favor of tumor than of abscess. The symptoms of tumor are more gradual in onset, and there is the absence of the temperature to indicate some suppurative process, which in cerebellar abscess is apt to be elevated in the beginning of the case and subsequently become normal or subnormal. Again, in tumor choked disc is much more frequent than it is in abscess.

I think it is a correct statement to say that whereas the localization even of tumors is made with great difficulty, the localization of abscesses is often more difficult still.

Francis T. Stewart[5] trephined two cases in which a diagnosis of abscess of the brain had been made, but failed to find pus. Both of these patients died, and one proved to be a case of uremia on post-mortem; autopsy was not obtained in the second case. He also saw several cases in which the surgeon failed to find pus, although diagnosed as abscesses. He also reported several cases in which pus was evacuated after the

skull had been opened for other conditions and in which pus was not suspected. He also mentions another case in which an extradural abscess was evacuated and the patient died from a cerebral abscess. Another case which came under his observation was one of the thrombosis of the lateral sinus which he drained, and in which an eminent neurologist subsequently made a diagnosis of abscess of the brain, owing to the persistence of symptoms, but in which the autopsy revealed no suppurative lesion other than that of the sinus.

Gardnes[6] reports a case of abscess of the temporo-sphenoidal associated with aphasia, alexia, agraphia and ptosis, which he explains by the fact that from the temporal lobe a band of associated fibres, which have to do with speech, proceeds to the frontal lobe, and a second band, a lesion of which causes alexia, extends to the occipital lobe.

Although an abscess of the temporo-sphenoidal lobe may be present and usually does exist for a period without producing definite symptoms, the following case, nevertheless, shows conclusively that pus confined within the temporo-sphenoidal lobe may suddenly produce symptoms simulating those of sinus thrombosis.

The patient, a man of fifty-two years of age, suffered for the past forty-two years from the recurrent type of chronic otorrhea, a sequel of measles; the intervals between the periods of aural discharge ranged from six weeks to four years. He was repeatedly advised not to have his ears treated, "as it might go to the brain," so he simply syringed the ear with weak soap suds whenever there was any discharge present. It is worthy of note that during the past two years, his acute exacerbations were progressively more frequent and accompanied by severe pain over the mastoid and adjacent region.

The writer saw him during his last attack, it being unlike any of the former ones, and characterized by an abrupt cessation of the discharge, the temperature suddenly rising to 105.2, with severe pain in and around the ear, being especially severe over the mastoid. He had severe chills, followed by marked remission in the temperature and severe sweating. Optic aphasia was well marked. These symptoms being characteristic of sinus thrombosis, an immediate operation was advised. Careful examination did not show the slightest evidence of jugular involvement. During the Stacke operation a moderate amount of necrotic bone was removed; the greater part of the

process, as is usual in chronic cases, was exceedingly dense and difficult to remove. The bone covering the sinus was hard and apparently healthy, except in some few spots, where eburnation was not yet complete. Much to my surprise, the sinus, when exposed, proved to be entirely normal. The only point at which free pus was found was in the tympanic cavity and the mastoid antrum, and even there in very small quantity.

Further examination revealed a small carious opening through the tympanic roof, which, upon being enlarged, revealed a quantity of foul-smelling pus oozing through an inadequate opening in the dura. Both openings were then enlarged to provide proper drainage, a large probe was introduced through the fistulous opening which led into the temporosphenoidal lobe, and upon its withdrawal an additional quantity of pus escaped. Following this, the active symptoms promptly subsided, the patient making a slow but uninterrupted recovery. Bacon reports a case somewhat similar to the above.

The following interesting case came under the joint care of Dr. Francis Stewart and the writer, and illustrates our faulty methods of brain localization.

The patient, a Russian tailor, aged 24 years, was admitted to the Jefferson Hospital October 21, 1906. His parents, three sisters, and four brothers, are living and in good health, and there is no history of cardiac, renal, tuberculous or malignant disease in the family. He never had any of the diseases of childhood, although at one time during infancy he was exposed to severe cold, which may have been the cause of his ear trouble. At any rate he has suffered from a recurrent suppurative otitis media of the left ear from early childhood, the discharge at times being profuse, offensive and brownish-yellow in color.

About six years ago the discharge suddenly ceased, after exposure to severe inclement weather; pain and tenderness developed in the mastoid, together with redness and swelling of the over-lying skin. The physician who was consulted at the time, made an incision through the soft parts and evacuated a large quantity of foul-smelling pus, thus relieving the mastoid symptoms, but not apparently affecting the otorrhea. The general health has always been good and no history of venereal infection could be obtained.

Present Trouble.—As nearly as can be learned, the patient

had dull headache, malaise, and loss of appetite for two weeks prior to entrance to the hospital. Two days before admission the aural discharge disappeared rather abruptly, the left mastoid became tender and painful, and a dull unilateral (left-sided) headache developed. The following morning mental symptoms, chiefly of a homicidal nature, appeared, although the patient seemed quite rational at times. There has never been chill or vomiting.

On admission the patient was dull and apathetic, but not delirious, although very restless at times. The respirations were accelerated, the temperature 103 F., and the pulse 60. The bowels were constipated, and there was slight nausea. The unilateral headache was the only symptom which seemed to be annoying. The pupils were normal in size, equal and reacting to light. The tongue was thickly coated, the breath foul, and the fauces slightly hyperemic. The thoracic and abdominal organs were apparently normal. The left auditory canal was narrow and blocked with thick, foul pus. The skin over the mastoid process showed the effects of a blister which was applied by the attending physician, and a slight depression due to the former operation. There was slight tenderness on deep pressure towards tip, but no distinct swelling or redness. Upon cleansing the auditory canal, abundant pus of a foul odor was encountered. The entire membrana tympani, as well as the ossicles, had been destroyed, and there was a distinct drooping of the superior and posterior wall of the external auditory canal, and a carious opening leading through the same and communicating with the mastoid cells. Examination of the eye-grounds gave a negative result. The neurologic examination was also negative, save for mental hebetude. The urine showed no abnormalities.*

The radical operation was performed by the writer, October 22, 1906. An old sinus was encountered above the mastoid, a little higher than the level of the auricle. There was some pus and much softened bone, removal of the latter necessitating exposure of a portion of the lateral sinus. After thoroughly curetting the middle ear cavity, the old sinus was enlarged with the chisel, considerable pus being evacuated after reaching the dura. The abscess cavity lay in the temporo-sphenoidal lobe and comfortably admitted the index finger above the second joint. It was washed out with salt solution and return drainage tubes inserted. A few silkworm-gut stitches were then

inserted above and below the exit of the tubes and the remaining space filled with gauze. After operation the head was elevated, stimulants administered, and elimination encouraged. Morphin hypodermically was needed on several occasions, as the patient was delirious and quite restless. Six days after this operation the patient began to show signs of cerebral compression.

A second neurologic report by Dr. A. Gordon is as follows: "The patient presents marked mental hebetude. It is difficult to arouse him. At times he would clear up, and then it is possible to make him execute some acts necessary for examination. Simple acts he would perform, but with delay. Complicated acts are not done by him because, I believe, of impaired comprehension. The physical symptoms are as follows: When told to raise his foot, he would first bend the leg over the thigh, and the thigh over the pelvis, and only then the foot. When told to raise his hand, he would first bend the forearm over the arm, and only then raise the entire limb. The phenomenon was present on both sides. The knee jerk is exaggerated on the right and diminished on the left. There is a slight Babinski on the left, but a distinct paradoxical reflex on the left. No ankle clonus on either side. The reflexes of the upper extremities are exaggerated. There is hyperalgesia in the lower extremities and hypalgesia in the upper. There is apparently no cranial nerve involvement, but this cannot be accepted as absolutely correct, as in view of his mental condition it was difficult to make the patient execute uniform movements at each test, either with his eyes or facial muscles. The tongue, however, protrudes to the right.

"In view of the irregularly distributed symptoms and chiefly because of the presence of the above phenomena in raising the foot or hand (asynergy), the cerebellum is probably involved."

The following day the pulse was 45, the temperature 97, and mental hebetude quite marked. As these symptoms increased during the following three days, exploration was decided upon.

Second Operation, by Francis T. Stewart.—The original incision was separated and the opening in the skull enlarged. After exploring the abscess cavity with a negative result, the scalp incision was carried backwards and downwards, and the cerebellum exposed with gouge and rongeur. The cerebellum

bulged into the opening, showing increased intracranial pressure, although the pulsation was quite evident, and no pus could be found with the needle and trocar, not even by an incision. The temporo-sphenoidal lobe was, therefore, again explored, and a satellite abscess, containing perhaps a dram of pus, discovered above and in front of the original abscess cavity, apparently separated from the parent abscess by a very thin wall of healthy brain tissue. A double drainage tube was inserted into this through the original cavity, and iodoform gauze placed over the cerebellum. Following the operation, the patient's condition was very poor, and he was given vigorous stimulation and saline infusion.

The following day, November 2, 1906, somnolency was marked, but the general condition somewhat better, rectal feeding was necessary.

November 4. He answered when spoken to for the first time since the second operation, and took food by mouth. The pulse was quite weak. The patient was extremely restless at times, and was unable to recognize his surroundings.

Novmber 5. Fed through nose and by nutrient enemata. A little weaker.

November 7. Condition same.

November 8. Unable to speak, but noticed when spoken to. Hypodermoclysis. Sudden elevation of temperature.

November 9. Slightly better circulation.

November 10. Decline of temperature. Spoke some. Much clearer mentally.

November 12. Much improved. Answers questions. Wound discharge free and still foul.

November 14. Some slight signs of compression. Tubes carefully cleaned, and by November 15 patient much improved.

November 20. Patient got out of bed and walked about eight feet.

November 23 to 26. Patient irritable and noisy.

November 26. Morphin and hyoscin resorted to.

November 27. Patient clearer than ever before. Was able to tell and spell his name; spoke of business, etc.

The patient left the hospital about the middle of December and was seen only a few days ago, and has improved markedly, both mentally and physically, being able to return to work.

In conclusion, I wish to remind you that in the foregoing in-

teresting case, with the exception of the otorrhea, there was an entire absence of diagnostic symptoms suggesting either the nature of the brain lesion or its location. Had it not been for the fact that an old sinus was discovered, we would have been in absolute ignorance as to the exact location of the pus formation. Furthermore, had the temporo-sphenoidal lobe been explored in the usual way, it is unlikely that all the pus would have been evacuated, from the fact that the satellite abscess formation had already formed.

There was also an entire absence of either chill or vomiting.

Repeated examinations of the eyeground gave negative results, while the neurologic examinations were of little or no diagnostic value.

VIII.

THE DETERMINATION OF AURAL ACUITY BY MEANS OF THE WHISPER TEST.

By Prof. H. Zwaardemaker, Utrecht.

Translated by Clarence Loeb, A. M., M. D.,

st. louis.

Oskar Wolf, in his famous little book "Sprache und Ohr," 1871, was the first to suggest the testing of the hearing of normal and diseased ears by means of ordinary speech. As is well known he determined the distance at which a whisper should be heard. The whisper test very quickly took the place of the ordinary speech, since it was found that otherwise too much distance would be required. In addition, are the following reasons: (1) The greater equality of the whisper as far as accentuation is concerned. (2) The theoretical superiority of whisper, which is made up of pure tones without the quality of sound due to the vibrations of the vocal cords, which are foreign to speech.

However that may be, whisper is universally used as the test for hearing. As to the normal distance up to which it can be understood, the opinions are widely divergent. O. Wolf considered 18 meters as the normal distance, while the German military rule puts it at 23 meters. This should cause no wonder, for the result depends on the words chosen, in addition to the energy of the respiratory current and the distinctness of articulation, which is very different in different people. Mistakes are made in nasalized words, in soft and hard explosive tones and in *a* and *eu; r* is frequently not heard; *u* is considerably harder to understand than the clearer vocal tones. Among the consonants, *s* and the sharp *ch* are most easily heard. To obtain the correct valuation, an extensive, almost statistic, investigation is necessary, requiring a large number of confusing words and untiring patience. The valuation of the hearing obtained in this way, is 18 meters, Wolf's findings.

The lack of consistency in the results of testing aural acuity by means of whisper becomes viewed in a new light if the choice of words is undertaken in a *more systematic fashion.*

The possibility of doing this is furnished by an analysis of the sounds in different languages which was made last year by some physicists, physiologists and phoneticists. By means of speech-indicators and phonographs, analyses of vowels and consonants were made, which show the characteristic tone (the so-called formants) independent of the pitch of the vibrations of the vocal cords. The formants, it is true, are usually multiple for one and the same tone, and are then present in different intensity, but when once known, they are found to vary only slightly and are almost the same in high and low pitches.

The following tables give a view of the results heretofore obtained:

TABLE I.

HAUPTVOKALE. VOYELLES PRINCIPALLES. CARDINAL VOWELS.

AUTHOR	u	o	a	e	i	MOTS TYPES STICHWOERTER KEYWORDS
Pipping (Finnish)	g^2—b^2	b^1—c^2 a^2—c^2	f^2—fis^4 d^3—dis^3	ais^1, a^2—c^3	dis^3; c^4	Hauskuus, kuopio, satama, taide, kiuri
Boeke (Dutch)	cis^2	c^2	c^3—e^3	fis^4	dis^4	ver, loos, vader, meer, bier
Hermam (German)	c^1--f^1 d^2—e^2	c^2—dis^2	e^3—gis^3	d^2—e^2 ais^3—h^3	e^4—fis^4	
Sasswjloff (Russian)	c^1—g^1 c^2—e^2	b^1 - dis^2	g^2—a^2	b^3—dis^4	d^4—e^4	
Verschuur (Dutch Dialect)	d^3—dis^3	c^1; g^2	f^2—fis^2 cis^2—dis^3	b^3	g^2—a^2 c^4--dis^4	vulə: , o: vər; a: bram, heil, vli:hə.
Bevier (American-English)			d^2—gis^2 c^3—e^3			
Stevani (Italian)	d^1—a^2	d^2—d^3	e^2—e^3	f^2—c^4	c^4—e^4	uno, scopo, ascia, pepe, tic
Delsaux-Quix (French)	fis^1; g^2	b^1, h^2	c^2; g^2	f^2; c^4	c^3—d^4	nous, mot, sas, cesse, type

TABLE II.

VOYELLES ANORMALES, NASALES ET NEUBRES
ANOMALE, NASALE UND NEUBRALE VOKALE
ABNORMAL, NEUTRAL AND NASAL VOWELS

AUTHOR	(ö) (eu)	œ (oeu)	œ (un; eun)	a (an, en)	e, (ai, e)	e (in, ain)	ü	ə¹	ə²	Mots types Stichwoerter Keywords
Pipping	b^1 - c^2 g^2 - gis^2						a^2			kayrös, vüpyz
Hermann	f^2 - g^2						a^2 - b^2	g^2 - a^2	b^2 - e^4	
Ver-schuur	ais^1 e^2 - a^2						gis^2 - b^2	fis^2 , g^2		vöhəl, rüke, lae: lo,
Delsaux-Quix	d^2 ; f^2	f^2	g^2 h^2 - dis^2	g^2 - e^2	c^2 ; a^2 e^4 - d^4					feu, teuf, un, an, fait, fin

TABLE III.

DIPHTHONGS

Author	ei	œ Dutch ui German eu	ə³ Dutch ou	ai	oi	Mots Types, Stichwoerter, Keywords
Verschuur			d^2 , f^3			au ; ə
Boeke	e^2 , gis^3 , c^4					$\frac{v}{u}$ eis
Scripture				d^1 , c^3 , b^1		T, fly
Delsaux-Quix					g^2 , c^3 , c^3	toit.

TABLE IV.

KONSONANTEN. CONSONNES. CONSONANTS.

AUTHOR	r	ch	m	n	ng	l	p (b)	t (d)	k (g)	f (v)	sch	chi	s (2)	Methods
O. Wolf	C_{-2}, C_{-1}		f	f	f	f	e^1	fis^2 fis^3	d^2 d^3	a^2 a^3	a^3, d^3, fis^4		c^4 c^5	Observations
Zwaardemaker	A_{-2}		G	c	c									Flame Picture
Pipping	gis^2 $C - g^3$					g^2 gis^3								Analysis
Hermann	$g - {}_2c$ ais^3 cis^4	G_{-2} E_{-1} b^2 dis^3	$h^3 \cdot c^4$	$h^3 \cdot c^4$	$h^3 \cdot c^4$	$f^3 \cdot g^3$	a-ais	fis^3-g^3	fis^3-g^3	$f^3 \cdot g^3$ $a^3 \cdot c^4$	h^3 and higher	dis^3, d^4, f^4	gis^3 h^3 g^4	Analysis
Boeke	E_{-2} E^{-1} c^2, g^2 c^4, f^4													Analysis
Rousselot	C-c		b^2 d^3			dis, g^3 g^4								Analysis

When these tables are studied, it is at once seen that the sounds are divisible into two large groups, each of which belong to one of the zones on the scale devised by me.

However, considering the results of the analysis, there seems to be a displacement of a mediant towards the treble of the original border between the second and third zones, which was assumed in the standard note (512 vib.) of the physicist. For practical reasons, it is desirable, in dividing tones into zones, to omit certain sounds; namely *v* on account of its relationship to *w; b, d* and *g*, because in strong accentuation they easily pass over into *p, t* and *k; j* on account of its relationship to *i; l*, which is sometimes spoken as an explosive sound and sometimes as a consonant; also, for the present, *p*, concerning whose pitch in the different languages there is much dispute.

The other vowels, diphthongs and consonants have been arranged by F. H. Quix and myself into the following two groups:

(1) Sounds of lower pitch, from large *C*—*d*.[2]

(2) Sounds of higher pitch, from d^2—*fis*.[4]

The first group forms the zona gravis or bass-zone; the second forms the zona acuta or treble-zone. The tones of the same group are called isozonal.

In addition to the pitch, the intensity of the tone is of importance. The tones of the bass-zone have nearly the same intensity (loudness). They are, therefore, not only isozonal but also of equal intensity. The tones of the treble-zone are different, however, and are divisable into two rubrics, one consisting of those sounds heard at a moderate distance, and the other of far-carrying sounds. Grouping together those which are at the same time isozonal and of equal intensity, there are formed three natural groups of elements which have a similar acoustic value:

A. Sounds of slight intensity and lower pitch: *o, u, w, m, n, r.*

B. Sounds of higher pitch, heard at a moderate distance: *i, ü ei, au, f, t, k.*

C. High-pitched, far-carrying sound: *a, e, sch, c, z.*

The distance at which these sounds can be understood by normal persons are not the same for different languages:

	A	B	C	Author
Dutch	11 meters	22 meters	33 meters	Quix
German	20 meters	31 meters	44 meters	Reuter

By means of isozonal sounds of equal intensity, words can be selected which reduce to a minimum the power of the hearer to guess them, since the constituents of the word are enunciated with the same clearness. It is best to select monosyllabic words, because in polysyllabic words the accent of one syllable and the sounds forming it are more emphasized than the others. There are languages,* however, where there are no monosyllabic words found of isozonal sounds of equal intensity. Then, dissyllabic words must be used, whose parts are accentuated as nearly equally as possible.

Words composed of elements of equal value are heard at a less distance than the tones composing them. The principal reason is that the tone by itself, is always held longer than the same tone in a word. The sensation, in consequence of the longer duration, is more intense. In every language, therefore, it is necessary to make a special investigation of words composed of equal elements as to their carrying power. This was done in our laboratory, as follows: Dutch, by F. H. Quix; German, by C. Reuter; French, by V. Delsaux. For the Dutch, four nurses acted as hearers; for the German, Miss Reuter, and for the French, Prof. Toubeaux.

The following tables contain the results in the form of "Association Phonetique:"

*E. g., the Italian, as was shown in my laboratory by Dr. Stevani, February, 1904, while making a phonographic examination.

TABLE V.

CONFUSION WORDS FOR USE IN TESTING.

Dutch	roer, moe, roem, oor, room, oom, worm.		6
German	Uhr, Ruhr. Rum, Wurm, Moor, Mohr, Ohr, Rohr, Ohm, Rom.		8½
French	mou, nour, roue, eau, mot, nom.		9
Dutch		kick, tik, kik, tyk, feit, kyf, kei, tuk, tuf, fut, fout, kout.	14
German		tau, teut, tuck, toff.	18
French		tic, tuf, fai, feu, toi, foi.	19
Dutch		aas, zee, zes, esch.	30
German		schach. sechs, schiess, scheich, ass, see.	37
French		cesse, cher, chat, séche.	30--35

TABLE Va.

CONFUSION WORDS FOR TESTING HEARING.

(Written in Association Phonétique.)

Dutch.	rur, mu, rum, o:r ro:m o:m worm		6
Ger.	ur, rur, rum, wurm, mo:r o:r ro:r o:m ro:m		8½
French	mu, nu, ru, o: mo: nom		9
Dutch.		ki:k, tik, kik, teik, feit, keif, kei, tyk, tyf, fyt, foot, koot.	14
Ger.		tau, toit, ty:k, tof.	18
French		tick. tof, fui, fo, twa, fwa.	19
Dutch.		a:s se: ses es	30
Ger.		sac, seks, si:s, saic a:s se:	37
French		ses, se: sa, ses.	30—35

For the phonetic translation, see

PAUL PASSY,

L'Ecriture Phonetique

Association Phonetique. Bourg la Reine. 50 centimes.

Collecting the results of this investigation, I should like to call attention to the following points:

1. Words can be selected composed of isozonal sounds of equal intensity, which are heard with equal intensity in all of their parts, where, therefore, guesswork is reduced to the minimum.

2. These words are especially suited for testing the aural acuity, because the words of the same group carry the same distance. This distance, of course, varies within certain limits, according to external circumstances (more or less distinct articulation of the examiner, aural acuity of the patient, construction and site of the place of examination). Under the same conditions, however, the words of the same group are heard at the same distance.

3. Unfortunately, the number of such words is very small in some languages. It would be very desirable to have a larger collection, but the number is entirely sufficient to test the aural acuity of all except simulants.

4. It is possible by means of this method to prove Wolf's belief in the existence of partial deafness. Both in normal people and in those with equal loss of hearing, there are found a number of 3 values which bear to each other about the relation of 1: 2: 4. If this is not true, the case is one of unequal loss of hearing.

IX.

A CASE OF CHRONIC SINUSITIS CURED BY INTRANASAL TREATMENT.*

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My object in reporting the following case is simply to present a rather striking example of chronic inflammation of the frontal and ethmoid sinuses and the antrum of Highmore cured without recourse to any external cutting operation. There was nothing original or novel about the method of procedure. It was simply a case of perseverance. Had the patient's general condition permitted, there is not the slightest question that a radical operation would have been advised as it was clearly indicated.

It seems to me that reports of cases such as these are particularly valuable at this time when enthusiasm is strong over external operations, especially the Killian, and when every rhinologist is so ambitious to add to the number of such operations that he has performed, that he may sometimes find it difficult to resist the temptation to do a radical operation on some case which, for one reason or another, were better treated in a more conservative manner.

If any of those here have such a case now under his care, he may derive some encouragement to persist in a conservative course from my experience.

Mrs. J. R. W., aged 64, came to me first in July, 1905. She stated that she had had a severe cold about five months before and that there had been a purulent discharge from the left nostril ever since with some frontal pain and tenderness. The pain was not so severe as to be unbearable, nor was it constant. The purulent discharge was rather profuse. Examination of

*Read at the annual meeting of the Eastern Section of the A. L. R. and O. Soc., Providence, R. I., January 5th, 1907.

the nose showed the septum thickened and deviated to the left causing considerable obstruction of that nostril, which was increased by the swollen turbinates, the middle turbinate remaining in contact with the septum even after being shrunk with cocain, while creamy pus bathed both the turbinates. The patient's general condition was decidedly poor. She was a small, slight, delicate woman who had been somewhat of an invalid for a number of years. Her pulse was never less than 100 when she came to my office and she got out of breath very easily. The exertion of merely coming in the cars to see me exhausted her very much. Under these circumstances even the intranasal treatment could not be very protracted at each visit at first. Later, by directing her diet and making her live out of doors as much as possible, her general condition improved considerably.

Her left antrum was seen to be dark on transillumination and a puncture with a medium sized trochar was made through the inferior meatus and considerable odorless pus washed out. The antrum was washed six times in the next ten days with a normal salt solution containing about 4 per cent of boric acid. But there was no noticeable improvement. Realizing then that the ethmoid, and probably also the frontal sinus was affected, the next step was to remove by cold wire snare the anterior portion of the left middle turbinate which completely filled the upper portion of the narrow nostril and blocked the drainage from these sinuses. The patient was so much exhausted by her visits (it took her an hour to come from her home to my office) it was deemed best to give only one treatment a week. For the next three months, treatment consisted in washing out the pus which collected in the antrum and removing tissue from the ethmoid region with cutting forceps and curette. In the latter procedure I attempted to work in the directions from which pus appeared to come. By this time I had almost begun to despair of being able to cure the case by intranasal treatment. While the pain and tenderness was less, and the patient thought that the discharge was less through the week, the character and amount of pus showed little if any change since the first visit. But the general condition still precluding radical operation under general anesthesia, there was no course left but to abandon treatment entirely or persist on the same course as heretofore. As I have already partially indicated, this was to cocainize the more thoroughly by means of pledgets of

cotton soaked in an 8 per cent solution of cocain and then to further shrink the tissues by 1-1000 solution of adrenalin applied in the same way. The ethmoid region was then carefully wiped out and the source of any pus that was seen was followed up carefully with a probe and the diseased tissue in that region removed by means of cutting forceps and delicate curettes. Guided by the pus in this way I, one day, introduced the probe into the frontal sinus and following the same course with a small ring curette I removed considerable granulation tissue and enlarged the frontonasal duct. In using the curette in the duct I was careful to exert pressure forward and downward only. I then washed the frontal sinus with a mild antiseptic solution through a small silver canula introduced through the duct. This treatment was continued for the next three months at intervals of a week or ten days. The antrum was also washed at each visit. There was a gradual improvement during this period. The amount of pus washed from the antrum diminished and became more mucous in character. This was true also of the washings from the frontal sinus.

Frontal pain and tenderness had now disappeared. Occasionally after washing out the frontal sinus I injected a 70 per cent solution of alcohol. This was not painful and I believe was of benefit. During the next two months the patient was treated six times. She had come down from using a dozen or more handkerchiefs a day to only one and had little or no discomfort. There was still a moderate muco-purulent nasal discharge and a clump of muco-pus could generally be washed from the antrum.

About a month later she made her last visit. My notes say, "July 10, 1906, no pus in nose. Both antra and frontals transilluminate. The patient has no nose or throat symptoms."

A letter dated December 14, 1906, in answer to one of inquiry from me, says: " . . . . I am glad to be able to tell you that your cure was complete. I have had no trouble from my head or nose, though I have, once or twice, had a cold which affected my throat considerably."

The treatment extended over a period of about one year, during which time the patient made forty-five visits.

X.

PAPILLOMA OF THE NOSE; A CASE OF HYPEROSMIA; A CASE OF PANOTITIS COMPLICATED BY EMPYEMA OF THE NASAL ACCESSORY SINUSES, WITH SEVERAL UNUSUAL FEATURES.*

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CASE I.—PAPILLOMA OF THE NOSE.

From the time of Hopmann's celebrated paper in 1883, the subject of nasal papilloma has been a fruitful source of discussion, especially from the pathologic standpoint. Dr. Jonathan Wright, a former member of this society, has done much toward the clearing up of this mooted question. Today it is generally recognized that what Hopmann described as papilloma was not a true papilloma at all, but, as Wright calls it, a papillary hypertrophy. True papilloma of the nose is an exceedingly rare tumor. Wright in his paper on the subject in 1891, while not pretending to exhaust the literature, and frankly admitting the impossibility of running down all the cases on account of the faulty nomenclature and the lack of a microscopic examination, was able to collect less than a dozen. Bosworth had seen one papilloma in 290 benign growths. We have not attempted to search the literature since 1891, but we do not recall seeing any case reported in recent years. On account of the rarity of the affection as well as because of sev-

*Read at the meeting of the Eastern Section of the American Laryngological Rhinological and Otological Society, Providence, Jan 5, 1907.

eral features not mentioned by writers on the subject, we desire to report the following case:

Dr. V., age 68, consulted me last spring, complaining of difficulty in breathing through the left nostril. He had always enjoyed good health, but felt that the difficulty in breathing, together with the habit he had acquired of using cocain to get relief, was pulling him down. There was no pain in the nose and he had not had nasal bleeding. Examination of the throat and nasopharynx was negative. Examination of the nose showed a papillary growth obstructing the left nostril and situated about 2 cm. inside the vestibule. The probe discovered that this was attached to the septum, to the floor of the nose and to the anterior portion of the inferior turbinal. Inspection of the right nostril revealed a small amount of a similar growth attached to the septum anteriorly. The growths were removed by the cold wire snare and curette and the bases carefully touched with the galvano-cautery. The microscope showed them to be true papillomata. The patient was seen during the month of December of last year. A slight recurrence had taken place in the left nostril on the septum alone. The patient was feeling in good general health.

A mark of distinction between the true papilloma and the papillary hypertrophy is the situation of the growth. The former is found in the anterior part of the nose, while the latter is confined to the posterior portion. With this rule our tumor corresponds. We have no record of a case where the growth was found in both nostrils at the same time. The possibility of a malignant tendency is mentioned by several authorities. In our case, this was considered on account of the age. There was, however, no suggestion of it. That it can occur is shown by the remarkable case of Verneuil in which the papilloma recurred in the larynx and bladder after removal and death finally resulted. Bosworth says that they are found in early adult life and more commonly in children. This does not apply in the case just reported, and on account of the haze which has hung over the diagnosis till recently, we question how much weight can be placed upon this observation. Our patient resembles the others reported in presenting no characteristic symptoms. The development of the tumor is usually a slow one and the only complaint is an increasing discomfort in breathing.

CASE II.—A CASE OF HYPEROSMIA.

Disorders of the sense of smell are not at all uncommon,

especially when they concern an impairment or abolition of that function, commonly known as anosmia. A great deal has been written upon both the pathology and the treatment of this affection which is generally regarded as an organic disease. Much less frequently met with are the pure functional neuroses involving the sense of smell. Of these parosmia or the perversion of smell is occasionally seen. Dr. Munger, a fellow member, read a paper on this subject, if we are not mistaken, a few years ago in which he gave some remarkable instances of such perversion. Hyperosmia or hypersensitiveness of the sense is an exceedingly rare disorder, at least as encountered by the rhinologist. In twenty years of professional work we do not recall seeing any but this case which we are about to report. Wherever mention is made of the disorder in text-books upon the nose, hysteria is given as a cause. This may explain why we see so few of these cases, i. e., that they are treated by the neurologist or internist.

Mr. K., age 57, banker, consulted me in November of last year giving the history that he had been a great sufferer for years because of his extreme aversion to odors. On inquiry it was learned that it was only certain odors which produced this distress, especially strong, cheap perfumes, cabbage and turnips when cooking and similar substances. These affected him so unpleasantly as to produce headache and nausea, with vomiting at times. Further questioning brought out a history of several attacks of neurasthenia as well as a chronic stomach difficulty, for which he had consulted Prof. von Norden during the preceding summer. He further stated that in the past when his stomach had been giving him especial trouble, he had suffered more from the nasal disorder. Examination of the nose showed a moderate degree of chronic rhinitis in the terminal stage. There was no complaint of nasal discharge or stenosis. No contacts of the turbinals with the septum were detected. A diagnosis of hyperosmia secondary to disturbance of the gastro-intestinal canal was made. Under gentle local applications of argyrol 25 per cent, combined with the use of the galvanic current direct to the nose, there has been a most satisfactory improvement in the condition. He has been warned, however, that any renewal of his stomach difficulty or another breakdown will bring on the disease again.

The pathology of this and allied functional disorders of the sense of smell offers a most interesting field for investigation.

A clinical report, as this alone pretends to be, is not the place for a consideration of this question. We would remark only that while they have been generally ascribed to hysteria, it is greatly to be doubted if that is the usual cause. Certainly this case clearly shows a gastro-intestinal origin for the complaint. What the true connection between the two is, whether it is in reality a reflex as is generally stated, or whether it is a form of toxemia expressing itself upon the olfactory nerve, we are not prepared to say. We know only that the extent of auto-infection from the gastro-intestinal tract has not yet been fully appreciated.

CASE III.—A CASE OF PANOTITIS COMPLICATED BY EMPYEMA OF THE NASAL ACCESSORY SINUSES, WITH SEVERAL UNUSUAL FEATURES.

We desire to frankly state at the outset that we are not at all sure that this is the proper title for the case which we are about to report. No case in years has proved more puzzling, and in many particulars, it is still not clear to us today.

Mrs. H., age 48, consulted us on August 28, 1905, giving the following history: She had always been well; never had had any trouble with the ears till the present attack. She had had several operations upon the nose, some years before. The difficulty with the ears began upon December 17th of the preceding year. (You will note that a definite date is given for the onset.) On returning from a small social gathering, she was seized with pain in both ears with intense vertigo and tinnitus. We have no record that she lost consciousness. The ears soon began to discharge. How soon after the beginning of the attack we do not know.

These symptoms, except the pain, have persisted in a greater or less degree till now. She complained particularly of a constant pressure in the back of the head. Treatment at the hands of several competent physicians by the usual methods of inflation and massage had given no relief.

Examination showed a well-nourished woman of fifty who was so deaf that she heard only loud conversation in front of the left ear. There was entire loss of the right membrana tympani; the canal was perfectly free from all secretion. The left membrana tympani showed two good sized perforations, one in the centre and one in the posterior upper quadrant. There was a slight amount of moisture detected by the applicator. No necrosis was discovered by the probe. The C tuning

fork was heard 7/15 seconds in the left ear, which easily perceived the Civ by aerial conduction. A bilateral empyema of the ethmoid cells and of the both sphenoids was recognized, with polyp formation. A series of intranasal operations was performed which entirely relieved the empyema. At the completion of the operation of the sphenoid on the right side, the patient said I had struck the site of her pressure and dizziness. This was indeed greatly lessened by the operation. Gentle cleansing of the left ear caused the slight discharge to stop. There was a moderative improvement in the hearing in the left ear. On October 7th my records gave the tuning fork reaction as follows:

Left: C $\frac{3}{25}$, C ii $\frac{3}{7}$, C iii $\frac{3}{7}$, C iv $\frac{3}{3}$.
Right: C $\frac{0}{20}$; C ii $\frac{11}{10}$, C iii $\frac{9}{2}$, C iv $\frac{9}{9}$.

Galton was nearly normal in the left ear at 6 inches. At this time the patient was put upon a saturated solution of potassium iodid, ninety drops a day. Under the use of this, there was a most gratifying improvement in the hearing.

The vertigo also was decidedly better. On December 29th I made a very gentle application of vibro-massage to the left side of the head. This I have used in many cases without the slightest unpleasant results. Here it had the effect of bringing back the vertigo in a severe form which lasted for a number of weeks. On May 10th of the past year she was hearing exceedingly well and complained only of a slight return of the pressure in the head. At this time I made a great mistake. Instead of being satisfied with the marked improvement which had been made, I yielded to her importunities, and seeking to employ what would be the most harmless treatment I could think of that might do good, I dropped a few drops of a 1-5000 solution of adrenalin chlorid in the canal of the left ear. At once the patient was seized with intense pain in the ear. In spite of all I could do, this pain persisted for a number of days. With the pain, vertigo returned, the ear began to discharge, and she became almost stone deaf. This deafness has continued ever since. No particular reaction could be seen in the ear, nor did the Eustachian tube show an inflammatory swelling, though at the first the pain was referred to that region. Later the pain was in the bone behind the ear and a mastoiditis was suspected. The Eustachian tube, it might be said, had been carefully studied. It was freely open at all times but to make doubly sure on a number of occasions we easily introduced a large bougie with-

out benefit. We desire to add that this solution of adrenalin had been used before in a number of cases without the slightest ill effect and was employed after this with equally innocuous results. The solution was perfectly clear in color. It will be noted too that the pain followed instantly.

We have called this case one of panotitis. The sudden onset, the profound deafness, the vertigo and tinnitus together with the results obtained by the functional tests, all point conclusively to an involvement of both the middle and internal ear. Panotitis, as described by Politzer, who first used the term, is the result of some severe infection such as scarlet fever or diphtheria. There is always a sudden loss of consciousness. This did not take place in our case. At least we have no record of it. As some eight months had elapsed when we saw her, this may have occurred for a short space of time and no mention of it made in the history given. What was the nature of the invasion in this case? This is a question of much interest. The idea of one specialist who saw her was that it was diphtheria. On what ground he based this view, we do not know. It is perfectly possible that some virus could have entered the ear through the blood or lymphatic system. There was, however, not the slightest indication in the history of any acute involvement of the nose or throat. Granted that this was the case, we feel strongly inclined to regard the long standing disease in the accessory sinuses of the nose as primarily at the bottom of the aural invasion. Whether the middle or the inner ear was the first to be attacked, it is impossible to say. As Politzer states, the onset may be so abrupt that the two are attacked almost simultaneously. The relief to the occipital pressure obtained by the intranasal operative work is very suggestive of the close nasal association of the affection. Most incomprehensible of all is the violent return of all the symptoms by the local use of the adrenalin. We have since learned of a somewhat similar effect of the drug in another case. We have tried to explain it on the ground of a personal idiosyncrasy and yet this is not perfectly satisfactory. We have wondered if there could have been a defect in the inner wall of the middle ear and that the drops had penetrated directly into the inner ear. We had, on previous occasions, employed a number of astringent and aseptic solutions in this ear without causing the least discomfort, as well as used the adrenalin freely on many occasions in the nose.

XI.

THE EXAMINATION OF THE THROAT IN CHRONIC SYSTEMIC INFECTIONS.*

By J. L. Goodale, M. D.

BOSTON.

The object of the following paper is to present suggestions for examination of the throat which I have found of value in conditions of chronic systemic infection. With the more general recognition on the part of the general practitioner of the importance of the throat as an entrance point of infection, aid is more and more frequently sought of the laryngologist, in order to determine whether, in a given case, he can throw light upon the cause or origin of the general process. In the past twelve years I find, from a review of hospital and private practice, the largest number of such consultations relates to cases of cervical adenitis. Within the last year, many consultations have been held with orthopedic surgeons in cases of chronic arthritis. The question always asked is, "Does the throat account for the enlarged glands or is the throat the point of entrance for the infection of the joints?"

In answering these interrogations we must look beyond the question of whether the throat exhibits alterations visible to the eye. We must bear in mind both the normal and pathologic histology of the parts, as well as the nature of the special infection in question. We must distinguish between penetration of micro-organisms through the tissues of the throat and the absorption of toxins. In short, we must base our opinion, not only upon minute and painstaking examination of the case in question, but also upon an intelligent application of the related data in physiology and pathology.

Although a variety of infections probably enter the system through the throat, yet I shall confine my remarks for the pres-

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ent to tuberculosis of the lymph nodes and to infectious arthritis. In the study of the former infection the investigator is fortunate in possessing knowledge of the causative agent. If, therefore, we are able to follow here with accuracy the phenomena involved, we shall have a point of departure for the study of other diseases, where the cause and nature of the infection are less clear.

In studying the condition which the orthopedic surgeon terms infectious arthritis the investigator starts seriously handicapped. While clinical evidence appears to show that a state of infection exists, yet we do not know what the microorganism is, or whether the disease is due to the actual penetration of bacteria into the body or to an absorption of their products into the system. Nevertheless, experience has repeatedly shown that the discovery and removal of a septic focus in this affection have been followed by more or less complete relief to the joint symptoms. Since the condition bids fair in the future to engross the attention of the laryngologist with increasing frequency, it behooves him to have as clearly as possible in mind what conditions of the throat are likely to constitute an infection atrium.

With regard, in the first place, to cervical lymphadenitis, the laryngologist has to determine whether the exciting cause is tuberculosis or some other irritant. I shall report briefly nine cases of this affection, where it was possible to study with comparative fullness the pathology and course.

Case I. A boy, five years of age, seen April 2, 1904, in consultation with Dr. T. M. Rotch, had shown one year previously enlargement of the cervical nodes on the left side, subsequently diminishing. During the past month, several of the nodes again became enlarged on the same side, the largest reaching the size of a hickory nut.

Examination of the throat showed tonsils of normal contour and color, not enlarged or adherent to the pillars. The crypts presented no dilatation, and showed no evidence of retention of contents. A small non-obstructive pharyngeal tonsil was present. Under ether, both tonsils and the adenoid were removed. The left tonsil on incision showed a central collection of puriform material in a cyst-like cavity. Within a few days, the cervical glands on the left became larger and were removed.

The adenoid and left tonsil were examined microscopically

by Dr. J. H. Wright, and inoculation made into guinea pigs. The adenoid showed no evidence of tuberculosis under the microscopic, and inoculation into a guinea pig was not followed by tuberculosis. The tonsil showed giant cells and tubercles microscopically. Inoculation into a guinea pig was followed by tuberculosis of the spleen and lymphatic glands.

In January, 1906, the child was again seen. Since the operation he had been perfectly well, without a return of the cervical adenitis until three weeks ago, when a small mass appeared near the scar on the left, soft and elastic. Examination of the throat showed no sign of the left tonsil. Some small granules were visble on the posterior pharyngeal wall, and a certain amount of lymphoid tissue was found at the side of the right tonsil. The cervical nodes on the left were removed and found to be tubercular.

Case II. Girl, two years of age, seen with Dr. Rotch, February 23, 1904. For the previous three weeks, elevations of temperature occurred every afternoon from 100 to 101, accompanied by gradual enlargement of nodes under left jaw. The child was fairly well developed and nourished. Several cervical nodes were found on the left, the largest being the size of a hickory nut, the others about the size of a pea. The left tonsil showed moderate enlargement with marked dilatation of the crypts, and evidence of recent rapid proliferation, characterized by irregular mamillated surface, with here and there protruding digitations of lymphoid tissue. The right tonsil was smaller and presented nothing abnormal. Both tonsils and considerable adenoid tissue were removed.

After this operation the temperature continued to run irregularly, and the cervical nodes on the left were removed in about two weeks by Dr. Dane. Several weeks later other nodes on the left enlarged and were removed. Since then the child continued to improve in every way, and remained well until May 1, 1906, when again the temperature exhibited afternoon elevations to 100 and 101 and two pea-sized nodules appeared near scar on the left side of the neck. Examination of the throat now shows no evidence of lymphoid tissue at the site of the left tonsil, and in other respects presents nothing to account for the adenitis.

The tonsils and adenoid were sent to Dr. J. H. Wright for examination. Tubercles and giant cells with bacilli of tuberculosis were found microscopically in the left tonsil and in the

adenoid. Inoculation of a guinea pig with the tonsil was followed by emaciation and development of tuberculosis over the peritoneum and in the retroperitoneal and mediastinal lymph nodes and the spleen. The lymph nodes of the neck showed typical tuberculosis, and a guinea pig inoculated with the caseous material from one of the nodes was killed six weeks later and showed tuberculosis of the lymph nodes.

CASE III. Child, six years of age, was seen March 7, 1905, with Dr. McKean, for cervical adenitis, and showed a large adenoid, with hypertrophy of both tonsils. Several cervical nodes on the right were enlarged, the largest being the size of an English walnut. Clinical examination of the tonsils presented nothing beyond simple hypertrophy. The crypts were not enlarged, and there was no evidence of retention in the crypts. The tonsils and adenoid were removed and inoculated into guinea pigs. The animals inoculated with tissue from the adenoid were found healthy when examined six weeks later, while the pig inoculated from the right tonsil showed extensive tuberculosis.

CASE IV. Boy, five years old, seen May 18, 1904, with Dr. W. J. Donahue, for right cervical adenitis of several months' duration. Child fairly well developed and nourished, cervical glands on the right enlarged to size of Lima bean; tonsils apparently normal; moderate adenoid. On operation, the right tonsil showed considerable cheesy material in the center; the left tonsil and adenoid presented nothing abnormal. In September of the same year the child was seen, and showed a clean, normal-looking throat, with slight diminution in the size of the nodes.

The right tonsil was sent to Dr. J. H. Wright for examination. Microscopic examination showed giant cells and tubercles. Portions of the tissue were inoculated in a guinea pig, which was killed five weeks later, and showed tuberculosis of the retroperitoneal and mediastinal nodes, the spleen, the inguinal and one axillary node. Tubercle bacilli were demonstrated in one of the lymph nodes.

CASE V. Boy, five years of age, seen April 23, 1904, with Dr. L. F. Vickery, for right cervical adenitis of two months' duration. The tonsils were slightly enlarged and adherent to the pillars, but otherwise presented nothing abnormal. A moderate adenoid was present. Both tonsils and adenoid were removed.

The specimens were sent to Dr. J. H. Wright for microscopic examination. A guinea pig was inoculated from the right tonsil and killed six weeks later, showing tuberculosis of the lymph nodes, of the spleen and of the liver. The guinea pigs inoculated from the adenoid and left tonsil did not develop tuberculosis.

One month later the cervical nodes became slightly smaller and continued during the next year to decrease in size. The child remained well until April, 1906, when a single node on the right appeared rapidly enlarged, and showed central softening. Examination of the throat showed no evidence of hypertrophied lymphoid tissue at the former site of the tonsils, and nothing otherwise abnormal to account for the enlargement of the node. The general condition of the child was excellent.

CASE VI. Girl, two years, seen December 5, 1904, with Dr. Rotch, showed moderate enlargement of the tonsils and adenoid, with slight swelling of the cervical nodes on the left, the largest being about the size of a small pea. No operation was advised at the time, but during the following winter, the child had several severe colds, with increase in the size of the tonsils and of the adenoid, the cervical nodes remaining about the same. Except for a moderate hypertrophy of the tonsils, there was no abnormality noted on clinical inspection, there being no dilatation of the crypts or evidence of lacunar retention. The right tonsil and adenoid tissue were sent to Dr. Wright, who reported on May 23, as follows:

"The guinea pig inoculated March 11 with a portion of a tonsil received that day, was killed today, May 23, and shows extensive tuberculosis, obviously originating from the point of inoculation. The guinea pig inoculated with the adenoid tissue fails to show tuberculosis. Microscopic examination of sections of the tonsil and adenoid does not show tuberculosis."

CASE VII. Boy, four years of age, seen with Dr. C. P. Putnam, January 15, 1906, for right cervical adenitis of four weeks' duration, without other symptoms. The child was well developed and nourished. There was a moderate adenoid. The tonsils were moderately enlarged, but showed otherwise nothing abnormal, there being no dilatation of the crypts or acute inflammation. Three cervical nodes on the right side were enlarged to the size of a hickory nut. No change was noted during the following week, and the tonsils and adenoid were then removed.

Histologic examination by Dr. Wright showed one tubercle in a section from the right tonsil, none in the left tonsil or adenoid. The right tonsil and adenoid were inoculated into guinea pigs. Six weeks later, the pig inoculated from the right tonsil was killed, and showed extensive tuberculosis of the inguinal lymph nodes and spleen. The animal inoculated from the adenoid showed no tuberculosis.

CASE VIII. A boy, seven years of age, was seen November 13, 1905, with Dr. A. H. Wentworth, for left cervical adenitis of two weeks' duration, following acute tonsillitis. The node was about the size of a pigeons' egg, firm and not tender. The tonsils were markedly enlarged, with dilated crypts, containing considerable puriform detritus. The acute tonsillitis had entirely disappeared. One week later examination showed no alteration in the tonsils or in the node. Both tonsils and considerable adenoid were removed.

Dr. Wright reported simply hyperplasia of the tonsils and of the adenoid. Guinea pigs inoculated from these organs failed later to develop tuberculosis.

On the day following the operation the cervical node was smaller and in two weeks had disappeared from palpation.

CASE IX. A girl, nine years of age, was seen March 7, 1904, with Drs. Rotch and F. B. Harrington, for left cervical adenitis, of four days' duration, associated with reddening and swelling of the tonsils. The cervical nodes were about the size of a hickory nut. On the following day, the tonsils were more swollen and redder, and showed a white spot on the right one at the orifice of a crypt. Cultures from this showed streptococci, but no bacilli of diphtheria. The cervical nodes simultaneously became larger and more tender. Three days later, the acute inflammation of the tonsils had disappeared, although these organs remained considerably larger than normal. Nevertheless, the cervical nodes continued to enlarge, and at this time had attained the size of an English walnut. The tonsils and a small amount of adenoid were removed. In two days the lymph nodes began to diminish in size, and within two weeks could not be palpated.

Microscopic examination of the tonsils by Dr. Wright showed simple hyperplasia. No tuberculosis was found in guinea pigs inoculated with material from the tonsils and adenoid.

These cases, therefore, demonstrate first that tubercular

cervical adenitis may exist in association with the presence of tubercle bacilli in the tonsils, with or without visible changes in these structures, and is not necessarily affected by the removal of the tonsils. Second, that a form of cervical adenitis occurs, accompanied by distinct enlargement and subacute or chronic inflammation of the tonsils, and disappears after their excision. In the first instance, it appears reasonable to assume that a penetration of tubercle bacilli through the tonsils into the lymph glands has occurred; in the second, that an absorption of irritating material generated in the tonsils is taking place from them into the adjacent lymph nodes. In the latter instance, the removal of the focus of toxin production is followed by immediate relief.

Theobald Smith has shown that in cattle the bacilli of tuberculosis may enter the system through the mucous membrane of the mouth or throat, into the associated lymph nodes, without leaving any traces visible to the naked eye or discoverable by manipulation.

In seeking now to discover in what manner this penetration takes place we turn naturally to the experiments which have been made with regard to the behavior of foreign substances in contact with the epithelium of the tonsils. It is sufficiently established that penetration of dust and similar inanimate matter is continually taking place through the lacunar epithelium. It has not, however, been shown that such a penetration can take place through the relatively stout epithelium of the pharynx, and, indeed, microscopic inspection of the closely oppressed cells in these regions renders such an occurrence improbable. Whether the penetration of inanimate matter can take place through the lymph follicles of the pharynx is not determined, but at least one inhibiting factor may be mentioned, namely, the constant irrigation of these structures by the fluids of the mouth during deglutition, which will prevent a given particle of dust from remaining long over the intercellular spaces of the epithelium. This factor likewise exists in the case of the lingual tonsil, with its short, straight, and relatively wide lacunæ.

Although on theoretical grounds such an absorption is not likely to occur through the follicles of the pharynx or of the lingual tonsil, nevertheless, clinically, we know that at times, though rarely, certain micro-organisms may invade these structures, apparently in a primary manner. These infections

appear to be due chiefly to streptococci, and give rise to acute inflammations of the follicles of the pharynx or of the lingual tonsil. I do not know that primary infection of these structures by the bacilli of tuberculosis has been recorded, although secondarily, where the vitality of the mucous membranes has been greatly depreciated, such lesions are not uncommon.

Our knowledge in regard to the behavior of dust on the lymphoid tissue of the nasopharynx is less complete than in the case of the faucial tonsils, but by analogy there would seem to be no reason why the same phenomena should not occur, in spite of certain differences which immediately suggest themselves, such as the relative paucity of micro-organisms, the dependent position of the lymphoid tissue, and the shape of the lacunæ, which do not favor retention of foreign substances, and the small amount and different composition of the irrigating fluid. It does not, however, seem necessary to consider the pharyngeal tonsil separately and we may, therefore, omit it, for the present, from consideration.

Returning, now, to the faucial tonsils, observation shows that bacteria, while numerous in the crypts, are not ordinarily found below the surface of the lining epithelium, being apparently arrested by some agency which prevents their penetration. Whatever the nature of this agency, it is undoubtedly at times suspended, as I have shown in acute cases of tonsillitis, with the result of producing infection within the follicles or suppuration of the circumtonsillar space. It seems reasonable to assume that bacteria, if they enter at all, will enter by the same path which inanimate matter has found most easy, namely, through the lacunar epithelium, rather than through the more impervious membrane in the vicinity. Furthermore, the crypts of the tonsils constitute more or less sheltered harbors, where bacteria may linger, unaffected by the stream flowing past outside their orifices.

On the foregoing hypothesis it is evident that, other things being equal, bacterial infection through the throat would be favored by an increase in the size and number of the intercellular spaces of the lacunar epithelium and by the retention of the contents of the crypts. We have now to consider under what circumstances such favorable conditions for infection may be found.

With regard, first, to the character of the lacunar epithelium, examination shows that the number of the intercellular spaces

is proportionate to the amount of emigration of lymphoid elements from the follicles. Since such an emigration stands directly in relation to the proliferation present in the tonsils, it is chiefly in tonsils undergoing rapid proliferation of their elements, or in those which have attained a considerable degree of hypertrophy, that a loose character of the epithelium is chiefly marked. It is, therefore, found mostly in the young, or in older individuals where proliferation is maintained by one cause or another.

On the other hand, as I have shown in studies on the retrograde changes of the faucial tonsils, where atrophy of the follicles is marked and proliferation correspondingly decreased, the lacunar epithelium in the vicinity partakes much more of the stout, compact type covering the free surface of the organ. In other words, the tonsils under these circumstances would theoretically prove a more efficient barrier against the penetration of foreign substances.

Retention of lacunar detritus and opportunity for the development of bacterial activity will naturally be afforded by a narrowing of the orifices of the crypts. Such constriction may take place as the result of cicatricial contraction arising from previous acute inflammation or by adhesion to the tonsillar folds or the pillars in the vicinity or by process of retrograde metamorphosis. If the occlusion of the orifice of the crypt is complete, a cyst-like cavity will be formed. If this cavity is free from bacteria, it will exert no further influence upon the system, except, possibly, through pressure. If, however, the occlusion is not complete, but permits the entrance of microorganisms, those which are saprophytic will effect a decomposition of the lacunar contents, while those of pathogenic property may be permitted to live, multiply, and await favorable opportunity for entering the system.

Such a condition of affairs may usually be perceived clinically by the presence of cheesy masses in the tonsillar crypts, or in the supratonsillar fossa, or between the tonsil and the pillars, especially the anterior pillar. These are seen microscopically to consist of desquamated epithelium, both living and dead leucocytes, bacteria and, at times, even particles of food. Clinically, this condition is characterized to a greater or less extent by evidences of toxic absorption into the system, as evidenced by pallor, impairment of strength and spirits, fetid odor of the breath and gastric disturbances of various

kinds. It is, therefore, probable that the two chief anatomic factors favoring infection may be found in the looseness of the lacunar epithelium, prior to retrograde metamorphosis of the follicles, and in the retention of lacunar detritus.

With these facts now in mind, we are in a better position to answer the question whether in a given case the throat is responsible for an infectious process elsewhere. It will be seen immediately that the average tonsil may be an entrance point for infection without essential deviation from the normal type, either in size or other pathologic alterations. Our consideration must not only regard the strength or weakness of the supposed point of attack, but also the nature of the invader, and the resistance on the part of the host.

Tubercular cervical adenitis is essentially a disease of the young, and, as these cases have shown, may enter any tonsil, even of normal appearance, provided the micro-organisms are present in the throat and suitable predisposition on the part of the host exists.

Non-tubercular cervical adenitis from absorption of toxins produced in the tonsils would, theoretically, be accompanied by visible alterations in the latter characteristic of lacunar retention. This occurred in cases IV and IX, and is confirmed by many instances which have come under my observation.

In chronic infectious arthritis, we have, as yet, but scanty data, and more will be eagerly awaited. If it be true that this affection is due to a specific micro-organism, it would seem probable that it is constantly about us, as in the case of the pathogenic micro-organisms. In this event it is possible that bacterium may be more or less constantly present in the mouth, and that certain individuals are peculiarly susceptible to infection by it. On theoretical grounds it would seem more reasonable to assume that such predisposition is a primary factor in its causation, rather than that a certain state of the throat may permit of its development in any individual.

Given, however, systemic predisposition, local vulnerability would become of importance in determining an attack, and we are, therefore, impelled to seek for the place of diminished resistance. While the point of infection may occur in other regions than the throat, yet if these can be eliminated we should look carefully in the tonsils for such conditions as have been described.

Following out this line of thought we may say that the

arthritic individual predisposed to rheumatic infection finds in the adminstration of certain remedies, or in the restriction of his diet, means for resisting infection, or in controlling the development of micro-organisms after admission. The examination of a large number of cases of infectious arthritis, with regard to the conditions of the throat, has demonstrated the existence of pathologic alterations in the tonsil characterized in general by retention of lacunar detritus, with or without hypertrophy of the organ. Since, however, inspection and careful clinical examination may fail to disclose deep-seated collections of detritus, communicating by circuitous passages with the open air, it seems to me wise, if other points of infection can be eliminated, to extirpate the tonsils in the most thorough manner. We shall thus replace a tissue of diminished resistance by a stout barrier of compact structure without nook or recess to harbor a pathogenic parasite. * *

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XII.

EPITHELIOMA OF THE EAR.*

By William C. Braislin, M. D.

SURGEON BROOKLYN EYE AND EAR HOSPITAL.

Epithelial growths of the ear are rarely met with in private practice and but little more commonly encountered in our special clinics. Some data regarding their occurrence in hospitals are later given.

The relative frequency of occurrence of carcinomatous growths of the ear compared with those of other parts of the face is interesting; data having relation to this point are also herewith furnished.

The annual reports of the Brooklyn Eye and Ear Hospital show that before 1892, epitheliomata were not distinguished, in listing, from other tumors of the auricle. From 1892 to 1906 twenty-one (21) cases have been treated there. The Manhattan Eye and Ear Hospital Reports contain a much smaller number. In 1885 and 1886 one case each year was listed; since, none. The New York Eye and Ear Hospital listed in the years 1897, 1898, 1899 one case each year. The Harlem Eye, Ear and Throat Infirmary listed a case in 1905. The New York Skin and Cancer Hospital Report for the year 1904 listed the following cases of epitheliomata of adjacent regions: of the face, 28; lip, 22; nose, 8; ear, none. In 1905: of the cheek, 2; eyelid, 6; face, 22; forehead, 1; lip, 23; mouth, 2; nose, 9; ear (carcinoma of ear), 2.

Epitheliomata of the external ear are characterized by very slow development, perhaps the slowest of any region of the body. The considerable amount of cartilaginous structure in the external ear is no doubt responsible for this. Even more than of other parts of the head, epitheliomata of the external ear seem susceptible of successful and complete eradication. A very advanced case of the writer's, which was causing much pain, foul odor and disfigurement, was eradicated. Suc-

*Read at a meeting of the Brooklyn Pathological Society, October 11, 1906.

cess would seem especially likely if seen and treated early. The reason is probably the same as that given above, as the cause of their very deliberate extension, namely, the amount of cartilaginous tissue in the external ear; also because of their accessibility and consequent ease of complete eradication, when confined entirely to the external ear.

One case seen by the writer was stated to have existed for thirty-five years. Another for a nearly equal time. Two cases, which had reached an advanced stage, presented raw, suppurating ulcers with surrounding tumefaction and induration. Two on the other hand showed only deeply ulcerated, suppurating surfaces.

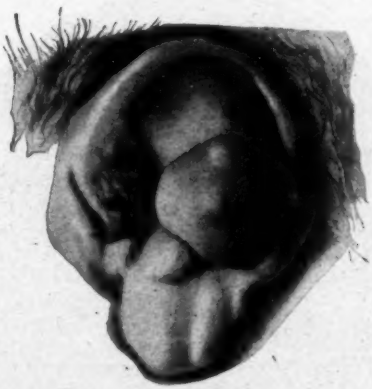

Fig. 1, Case I.—Epithelioma of external ear. Drawing made from amputated ear, upper part restored. The projecting mass was more globular than the drawing shows, the formalin preservative produced a somewhat irregular surface from shrinkage.

The most common point of origin is at the upper portion of the helix, according to Politzer.[1] Epitheliomata originating in the auditory canal seem to be of great rarity. The writer has seen a case through the courtesy of Dr. B. C. Collins, in a young man of 19 years which was pronounced by a pathologist to be an epithelioma. This case was treated for a long time by a practitioner with apparent success, but the Doctor has recently learned of its return.

The immediate causation of morbid growths of the external ear is not often apparent. One of the cases here figured was

due to prolonged irritation from a piece of roughly bent wire used in place of a spectacle frame.

Cancer originating in the middle-ear is, on the other hand, always due to one cause, namely, long-continued middle-ear suppuration. One case of this nature has but recently come under my observation.

Cases of cancer beginning in the middle-ear must soon extend to the canal, whence they may attack the parotid gland, tongue, jaw or accessory cavities of the nose, orbit and cerebrum. Cancer may involve the middle-ear by extension from adjacent structures. Some light on the origin of cancer of the ear has been given by P. G. Unna in his work on the skin. He de-

Fig. 2, Case I.—Drawing of microscopic section, cut horizontally through base and body of the projecting, globular mass.

scribes an affection occurring in men who spend their lives at sea, or constantly exposed to sun and wind, under the name of "sailor's skin." Pathologic changes occur in the parts of the skin most exposed. The condition noted in sailors and longshoremen he describes as follows: "At first there appears on the ears, the adjacent parts of the cheeks and temples, the backs of the hands and fingers, a diffuse cyanotic redness, similar to that due to frost. Then the skin becomes mottled, spots

of pigment, sometimes reticulated, becoming evident. The islands of skin between them partly lose their pigment." Ulcers form which extend laterally, the epithelial proliferations finding a hindrance in the dense plasmomatic cellular infiltration beneath, which strives to encapsulate it. From this ulcer, as from every "flat" cancer, there develops an ingrowing spreading one. Specimens of tumors at this stage were obtained both from the ear and the eyelid.[2] Epithelioma of the external ear is first noticed by the patient as a scab or small "sore" which very gradually increases in size.

Pain is a variable symptom. It has been found practically absent in one case of very advanced growth. In another some-

Fig. 3, Case I.—Photograph made shortly after amputation, while granulation was proceeding. A tag representing the upper part of the ear drawn downward and stitched to cut edge of posterior incision. By an error in printing the photograph the face is reversed, appearing as the right instead of the left side.

what similar case seen by the writer pain was very marked. It seems to be a marked feature only at advanced stages of the disease. In one case, the severity of the pain alone was the symptom which drove the patient to seek relief. In this case its intensity seemed due to the interference occasioned with the return circulation. In the case of epithelioma of the canal, the growth was the seat of more or less constant pain.

Deformity. In one case of the writer's a considerable portion of the lobule sloughed off *en masse* as the pedicle of skin which held it became gradually thinner, thus finally becoming self-amputated. Swelling and deformity of the ear may be slight, or reversely, very marked. In a case seen, but

not here figured, the growth was but a shallow ulcer of the concha which had existed with but slight extension for many years. Another case was the reverse of this (Fig. 1). A remarkable tumefaction existed having at its most prominent part the appearance of a large, smooth sebaceous cyst, with unbroken surface. In front of this swelling and also on the posterior aspect of the ear were tumefied, suppurating ulcers. The writer regards the presence or absence of tumefaction to be largely due to the degree of interference with the circulation which the growth causes.

The history of the writer's cases is briefly given herewith.

Case I. P. H., aged 71, had a growth on his ear for twenty years. Latterly it had increased in size and had become very

Fig. 4, Case II.—Photograph of epithelioma involving tragus, helix, anti-tragus, concha, lobule and auditory canal.

painful. Its appearance was somewhat remarkable, differing entirely from any others previously observed, yet exhibiting under the microscope, as it proves, the characteristic details of tumors of its class. (See microscopic section, fig. 2.)

On the posterior surface next the attachment to the head was a suppurating ulcer. Externally a large, smooth tumor projected for a distance of nearly an inch from the normal plane of the ear, and resembled somewhat closely a sebaceous cyst. The ear proper was dull, purplish red in color, apparently from congestion due to interference with the circulation. The canal was entered only by the smallest probe and contained pus. No enlarged glands were discovered. The ear was amputated with the exception of a portion of the helix, the upper extremity of which was cut straight across with scissors, then brought down to the edge of the wound where it was stitched to the

healthy skin edges. The remaining raw surface was drawn somewhat together with stitches, and allowed to heal by granulation. The healing was rapid and uneventful. The pain was entirely relieved from the day of operation, and it is thought a better cosmetic result was obtained by retaining the upper portion of the helix than would have been the case with removal of the entire ear.

Case II. W. Scott, 75 years old, under observation at the Brooklyn Eye and Ear Hospital, six years ago for nearly a year, and a skilled workman on coast-defense artillery. A man of unusual physical strength when in his prime. No history of syphilis. He attributed the cause of the "sore" on his ear to the use of a bit of coarsely twisted wire on his ear, to hold

Fig. 5. Epithelioma of ear, confined almost entirely to the antihelix. Reproduced through courtesy of Dr. Lutz. Case III was closely similar to this.

his spectacles in place The growth involved the canal, tragus, helix and concha. The lobule, which in the picture shows a partial separation, later sloughed completely off. He declined surgical interference, and the conservative remedies applied did little but afford slight temporary relief, until he passed from the writer's observation.

Case III. A thin man of 80 years. The cancer was an ulcer depressed below the surrounding surface, involving the concha and crus of the helix. It caused him no pain. The edges of the ulcer were clearly demarked, and there was a slight amount of suppuration. He stated it had existed over thirty years. He seemed likely to outlive its very slow development. He appeared at the hospital but once.

Case IV. Miss A. C., 48 years. The following rare history illustrates one of the possible results of prolonged middle-ear suppuration. Since childhood up to five years ago patient has had an otorrhea from the right ear with occasional attacks of pain and concurrent increase of discharge. Five years ago she consulted the writer, who instituted a course of treatment for its relief, but finally, satisfied that a cure was not otherwise possible, he advised a radical operation. This was performed in the usual manner, entering the mastoid and antrum, and enlarging the auditory canal so as to make of all one cavity. After the usual subsequent treatment the discharge ceased. She was advised to report if everything was not as it should be. She returned in March, 1906, stating she had had pains for three months and a recurrence of the discharge, but hoping each day it would be relieved spontaneously, as her attacks of earache previous to the operation had been, she had neglected to return promptly. The ear appeared much as when last seen. A very scanty discharge now existed, however. She had no elevation of temperature. Her pulse, always remarkably slow, was but 60.

In the depth of the meatus was a fairly large, firm mass of granulations or what was then regarded as such. This was cauterized with the expectation that a prompt disappearance of the granulations would take place. On the contrary the severity of the pain increased and, fearing intra-cranial trouble, we advised an operation on the ear again. The whole mass was excised. The bone of the tympanic roof was soft and was freely curetted, exposing the dura in an oblong area of perhaps an inch by an inch and a half. On recovery from the anesthesia her face was carefully noted for signs of facial nerve injury, but motion was perfect at this time. On the second day, however, a slight degree of facial paralysis appeared and slowly progressed. Potassium iodid was given, but was so badly borne that it was soon discontinued. The pain, too, had not in the least been relieved. Not until now did we suspect that we had a malignant growth to deal with. Specimens of the growth from rapidly sprouting granulations confirmed our suspicions. Six weeks from the time of operation a swelling of the corresponding cheek suddenly appeared and she could only with difficulty open the mouth. Granulations were vigorous in the canal. The swelling of the cheek finally pointed and, in hope that some relief to pain might be

secured, it was incised. The abscess cavity did not involve the joint nor the parotid gland. The granulation removed from the ear rapidly reformed. The incision suppurated freely and was at times offensive. The sprouting of granulations continued from both wound and canal. The swelling of the face became no greater, but rather less. The edge of the post-auricular wound became bluish and unhealthy. Pulse, which had previously been slow, became rapid and weak. An unpleasant salty taste (pus), which she had complained of since the opera-

Fig. 6. Epithelioma of middle-ear. Picture shows swelling of cheek and the facial paralysis at advanced stage.

tion, was more troublesome and the irrigations of the canal also ran into the throat at times. The pain was severe and required the taking of morphia to control.

Injections of Coley's serum of the toxines of erysipelas and bacillus prodigiosus were begun. She finally became so weak as to be practically confined to bed.

The effect of the last operation was thus unfortunate and seemed to hasten the development of the growth rather than retard it. Dr. Winfield tells me of one case of middle-ear epithelioma apparently successfully treated by the X-ray.[3] The treatment of this case by Coley's serum has been undertaken as

a last resort, though cases of epitheliomatous cancer in advanced stages have been reported successfully treated by the serum.[4] The deeply seated locality of a malignant growth in the middle-ear practically precludes the possibility of complete extirpation. Dr. Knapp[5] reported a case of malignancy of the middle-ear some years since, which rapidly progressed to a fatal termination after attempts at its removal had been made by well-known surgeons and himself. Assaky,[6] Kipp[7] and numerous others have reported similar results.

As regards prognosis, epitheliomata of the external ear and the middle-ear thus differ to an extreme degree. Those confined to the external ear, even of an advanced type, may yield readily to surgical intervention. A cancer of the middle-ear, confined within a bony framework and springing from the ear structures, certainly gives the surgeon but little chance of interference with the knife. In the case reported, operation seemed to stimulate its activity. The X-ray or Coley's fluid seems to offer a possible method of cure, though Coley's method and the X-ray are regarded as having their largest fields of usefulness or the greatest likelihood of success in malignant tumors of other classes than epitheliomata. Fortunately, however, both these offer some hope of success, the case I have mentioned as treated by the X-ray and some cases of epithelioma successfully treated by Coley's fluid being examples. While Politzer recommends the galvano or lunar caustic in circumscribed cases of cancer of the external ear, I regard the knife as preferable in all but the most circumscribed. In Case II, where we were forced to use caustics, it was not successful. In cases where partial or complete amputation of the ear is necessary an artificial ear can be made. Tiemann does this work in a thoroughly artistic manner.

Incidentally the last case emphasizes a fact which the ear surgeon has had so frequently to urge, that the otorrhea of childhood are capable of producing many untoward results, if neglected, and that no effort should be spared to bring about a cure at the earliest possible time.

XIII.

SOME POINTS IN THE DIAGNOSIS AND TREATMENT OF LARYNGEAL CANCER.*

BEING AN INTRODUCTION TO A DISCUSSION HELD IN THE MEDICAL SOCIETY ON JANUARY 28TH, 1907.

BY SIR FELIX SEMON, K. C. V. O.,

PHYSICIAN EXTRAORDINARY TO HIS MAJESTY THE KING.

MR. PRESIDENT AND GENTLEMEN:

When in 1881, on the occasion of the International Medical Congress of London, a discussion took place in the Subsection for Laryngology on Malignant Disease of the Larynx[1], the outlook with regard to the treatment of this formidable disease appeared very dark indeed. Intralaryngeal operation had been universally abandoned on account of its want of success; thyrotomy had been completely given up after the anathema pronounced upon this operation for the cure of malignant disease of the larynx three years previously by Professor Paul von Bruns[2] and the result of partial and of total extirpation of the larynx—operations then only recently introduced—had so far been anything but encouraging.

To-day, just about a quarter of a century after that discussion, I shall be able to unfold a very different tale before you. If, in accordance with the now general custom, we divide all cases of cancer of the larynx into two large groups—the extrinsic, which comprises those cases in which the disease starts from the epiglottis, the aryepiglottic folds, or the esophageal aspect of the larynx, and the intrinsic, amongst which are included the cancers originating within the laryngeal cavity proper—it will be seen that nowadays the latter category, if only early enough diagnosed and thoroughly operated upon, gives a better chance for recovery and freedom from recurrence than cancer in almost any other part of the body, whilst the extrinsic variety, although vastly different from the in-

*From the British Medical Journal, February 2, 1907.

trinsic with regard to the extent of the operation, the mortality from the surgical interference itself, the prospect of recurrence, and the amenity of life afterwards, still shows distinct progress over the results obtained twenty-five years ago.

In a paper merely intended to serve as an introduction to a discussion it will, of course, be quite impossible to travel over the whole vast field of cancer of the larynx and to do full justice to the work of all those who have helped to bring about a better state of things. To-night I merely conceive it to be my duty to take stock, as it were, of the present state of the question and to dwell more particularly on some points concerning the diagnosis and treatment of cancer of the larynx on which no consensus of opinion has yet been obtained[3].

Let me briefly repeat, then, what I stated in 1897[4], and what has recently been acknowledged by Professor Paul von Bruns[5], namely, that the improved state of matters is not so much due to the progress of our surgical technic, great and undeniable as this has been, as to the progress made with regard to the early diagnosis of malignant disease of the larynx.

If any one will take the trouble to look up the chapters devoted to cancer of the larynx in the textbooks of medicine, surgery, and laryngology published prior to 1888, he will find that the information given with regard to the symptomatology and the laryngoscopic signs of the early stages of malignant disease is extremely scanty, often inaccurate, and in not a few instances obviously more the result of theoretical construction that of actual observation. When, during the illness of the then German Crown Prince, the deplorable doctrine was promulgated that benign growths of the larynx showed a special proclivity to malignant degeneration after intralaryngeal instrumentation, I devoted, in the collective investigation which demolished that doctrine[6], a special chapter to the description of the early signs of malignant disease of the larynx. It is the less necessary for me to enumerate these signs to-night, as after a period of initial doubt and scepticism they are now generally acknowledged to be true and trustworthy, and have found their way into practically all modern textbooks. There is, however, one of them, the most important one, which has, as I know from practical experience, given rise to an equally curious and serious misunderstanding, which ought to be corrected on an occasion of this character.

Amongst other laryngoscopic signs which ought already at an early period of the existence of the new growth to draw attention to the possibility of its being malignant, I stated that none was more important than defective mobility of the affected vocal cord. This defective mobility, I particularly emphasized, manifested itself in some cases early, in others at a later period. Although this description seems plain and unambiguous enough, the curious misconception has arisen in some quarters that if this sign was absent in an otherwise suspicious new growth, the contingency of malignancy could be excluded. It seems hardly necessary to say that this inversion of my statement is absolutely inadmissible. Nowadays one gets to see a good many cases of laryngeal cancer at a very early stage—that is, when an otherwise inexplicable hoarseness forms the only noticeable symptom, and at that time the infiltration of the mother soil need not be advanced enough to cause troubles of mobility; and, secondly, seeing that in the larynx, as in any other part of the body, some cancers for a long time are of a more surface character than others, and begin to infiltrate the tissue from which they spring only at a comparatively late period, it is, of course, quite inadmissible to exclude malignancy in an otherwise suspected laryngeal growth for no other reason than that the affected cord showed no signs of defective mobility when the case came under observation. However, to prevent any further misunderstanding, I now wish to formulate the rule as follows:

"If the vocal cord from which a suspected laryngeal growth springs shows at an early period of the disease a defect of mobility other than due to mechanical impaction of the growth in the glottis on phonation, this sign is almost pathognomonic for the malignant character of the tumor. If, however, this sign should yet be absent when the case comes under observation, such negative evidence does by no means exclude possible malignancy."

It will have been observed that in the last sentence I stated that the presence of the defective mobility under such circumstances was "almost" pathognomonic. It is with good reason I express myself thus cautiously. For it must be sorrowfully admitted that, whilst the signs stated by me in 1888, which so far as I know practically form the last word upon the question of early laryngoscopic diagnosis, will be found

sufficient in the very large majority of cases to arrive at an early time at the correct diagnosis of malignant disease, they by no means do so invariably.

In fact, Mr. Butlin's dictum, pronounced about twelve years ago[7].

"There are three classes of cases: the first in which any one and every one can make the diagnosis; the second, in which only the better instructed and more experienced make it, and others do not; and the third class, in which the conditions are so obscure that no one can make the diagnosis unless the larynx is opened, and in some of which it is even then difficult to make sure of the nature of the disease"—

is as true today as when it was first enunciated. It is not only benign growths, tuberculous and syphilitic tumors and ulceration, perichondritis from different causes, the differential diagnosis between which and malignant disease of the larynx is occasionally excessively difficult or even almost imposible by mere naked eye inspection, but there are some weird and outlandish conditions, which may simulate cancer or sarcoma, which are not described in any textbook, and which really cannot be expected to come within the thoughts of the observer. Thus I have described a case in which a globular blood clot completely enveloped what ultimately turned out to be an epithelioma; in another case seen with Mr. Butlin the tumor was found to be a leucoma instead of the suspected epithelioma; in a third instance seen with the same experienced observer, an effusion of blood into a vocal cord closely simulated the appearance of malignant disease. In a case demonstrated before the Laryngological Society[8] not only the laryngeal tumefaction but also the general infiltration of the cervical lymphatics, which by four experienced observers had been considered as malignant, spontaneously disappeared after simply tracheotomy. In yet another case, which I repeatedly demonstrated before the Laryngological Society of London[9], an obscure chronic ulceration occupying almost the whole left vocal cord of a gentleman aged 60, which had been suspected to be either tuberculous or malignant, and concerning the nature of which the views at the meeting of the Society considerably differed, ultimately disappeared spontaneously after having been in existence for two years; and to-night again I have to bring before you another extremely obscure case of laryngeal tumefaction—the

second of the kind in my experience—in a recent thyrotomy case of mine, which I regret to say ended fatally on the day after the operation from acute edema of the lungs.

The naked-eye appearances of the tumor, which from its smooth surface was not suitable for the removal of a fragment for microscopic examination, neither on laryngoscopic examination nor when the larynx had been opened, left the least doubt in the minds of those present at the radical operation (Dr. Watson Williams, Mr. Stabb, Mr. Tyrrell, a medical friend of the patient's, and myself) as to the malignant nature of the growth, particularly since the left half of the larynx was almost completely fixed. Yet when the specimen had been forwarded to Mr. Shattock I received to my greatest surprise a report from him in which he stated that there was no carcinoma nor other form of malignant growth, but merely small-celled infiltration of the mucosa, nowhere extending into muscle or even to the glands, which were very numerous in one piece. The glands in all three pieces were quite normal, as was the tissue in which they lay; so was the muscle. A papillary upgrowth was present in a few spots, but there was no indication in any of the processes of malignancy. Tuberculosis could also be excluded. Here and there there was a small area of necrosis in the inflammatory tissue of the mucosa. Mr. Shattock therefore supposed that the whole disease was a chronic inflammation attended with swelling and some papillary upgrowth, and due to some infective process of no particular specific kind.

On my observing that the description thus given did not account in my humble opinion for the clinical appearances and course of the disease, there having been a very distinct tumor projecting into the interior of the larynx with a mammillated surface, and slight ulceration on various parts, causing not only complete aphonia, but also pain shooting into the ears, Mr. Shattock suggested that the growth might have been at first a simple papilloma, which had run an unusual course; that without being malignant it had become the seat of an infective process; that this had in turn been followed by ulceration and swelling, which had exaggerated the clinical signs of tumor swelling, and led to the fixation of the parts.

I can, of course, not say that this suggestion might not correspond to the actual facts of the case, but seeing our complete want of knowledge of the existence of such pro-

cesses in the larynx as those sketched by him in this and in my previous case, I frankly confess that the explanation does not seem very satisfactory, and I shall be very much interested to hear whether any of those present are able, after inspection of the specimen here shown under the microscope, to shed some light on the subject.

Cases like the seven just mentioned of course reopen the vexed and perennial question of the value of the microscopic examination previous to radical operation of intralaryngeally-removed fragments of the suspected tumor. The elder generation will remember how fiercely that question was debated about twenty years ago on the occasion of the fatal illness of the late German Emperor. The views then expressed diametrically differed. In the opinion of some, clinical and naked-eye observation was like nothing compared with the evidence gained by an expert's microscopic examination. The other side looked almost with contempt upon the help of the microscope, and stated that it was only in exceptional cases that it was of any use.

When the sad case was over I endeavored to strike the balance between these conflicting views, and summarized the results of the collective experience of the then most prominent laryngologists of the world in the following conclusions[10]:

Microscopic investigation of intralaryngeally-removed fragments in cases of doubtful laryngeal neoplasms is a valuable but not infallible help to clinical diagnosis. It ought to be used in all cases in which it is possible. This is by no means always the case, inasmuch as in cases of submucous infiltrating cancer, intralaryngeal removal of fragments is impossible. If such a removal is available one ought never to forget: (1) That it is by no means certain that the examination may at all yield results characteristic of any definite form of tumor; (2) that, even when the examination yields apparently characteristic results, the possibility must be kept in view that we have to do with a mixed form of new growth. This is particularly important in cases in which the tumor is clinically suspicious and in which the microscopic appearance proves its benignancy. But the reverse is also possible, as shown by a case of Schmiegelow's. It will, therefore, be always desirable to transfer the microscopic examination, if it be possible, to an expert pathologist. The pathologist, however, can only give an opinion on the fragment submitted to him, and not

on the disease itself from which the patient suffers, except when he finds in this fragment *positive* characteristics of malignant new growth. Examination must not be limited to the investigation of one single section, but must be extended over the whole fragment, which accordingly has to be cut up into sections, unless already previously the diagnosis of malignancy can be established with certainty. If necessary, cautious intralaryngeal removal and microscopic investigation of fragments of suspected growth must be repeated several times, unless meanwhile clinical symptoms which are incompatible with our present knowledge of the symptomatology of benign growth establish with certainty the malignant character of the suspected growth. In such cases radical operation, if otherwise indicated, is *not* to be postponed until the diagnosis has been confirmed by the microscope.

This proposition, I think I may venture to say, met with general acceptance, and is, I believe, up to the present moment followed by most of those whose work brings them in contact with cancer of the larynx. But it has not been allowed to pass unchallenged. Some years ago Dr. John N. Mackenzie of Baltimore passionately opposed the probatory intralaryngeal removal of suspicious laryngeal growths for the purposes of microscopic examination[11]. In his opinion such removal "subjects the patient at once to the dangers of autoinfection at the point of incision and to metastasis elsewhere; it stimulates the local growth of cancer, and the method is often inconclusive, sometimes misleading, and practically impossible."

I have fully answered, and I think refuted, Dr. Mackenzie's contentions some years ago[12], and would not have returned to the point now were it not for a surprising statement recently made in the excellent paper read by Dr. Chevalier Jackson[13] at last year's meeting of the British Medical Association at Toronto. He says:

"Of twenty cases of malignant disease operated upon by me, negative preliminary microscopic reports of removed fragments were made in fourteen. That this was due not to the pathologist's error but to the inadequate specimens goes without saying. In each of the fourteen cases, operation, in the face of the microscopist's negative report, was advised, on the strength of the age of the patient and laryngoscopic appearances, coupled with failure of benefit from mercurial in-

unctions and 180 gr. daily of potassium iodide continued for three weeks."

I confess that this statement amazes me. To judge from my own experience Dr. Jackson has certainly been exceptionally unfortunate. If in my own practice from whatever cause I had found the microscopist's report at fault in anything like a proportion such as 14 out of 20 cases, I have no hesitation in stating that I should have long since joined Dr. John Mackenzie, and instead of recommending microscopic examination of intralaryngeally-removed fragments as a valuable, though by no means infallible method, have rejected it not only as inconclusive, but, what is much more important, as directly misleading. But my own experience has been widely different. Whilst again fully admitting that in a large percentage of the cases in question it is impossible, without unduly irritating the new growth, to intralaryngeally remove a piece for microscopic examination sufficiently large to enable the microscopist to arrive at a reliable conclusion; and whilst further admitting, as I have done in the above-quoted rule, that the piece removed may in a good many instances not show characteristic evidence of malignant disease, I can remember but one case within my own practice in which the microscopic examination yielded directly misleading results. This was the case of the late Mr. Montagu Williams, which I fully described in the *Clinical Society's Transactions*[14], and in which the microscopic examination of the first fragment seemed to show that we had to deal with an innocent papilloma. But the mistake was corrected already five days afterwards, when examination of the second fragment gave definite evidence of the existence of epithelioma.

In many cases of my own, on the other hand, the microscopic examination of an intralaryngeally-removed piece of the new growth has not merely fully corroborated the clinical diagnosis, but has materially strengthened my hands in proposing immediate thorough operation. I therefore see no reason to withdraw from the attitude I recommended in 1888.

Two points, however, demand a moment's consideration at this juncture. In the first place, after two positive experiences of Dr. David Newman of Glasgow[15], fears were expressed twenty-two years ago lest the probatory intralaryngeal removal of a piece of growth might hasten the local progress, and lead to infection of the cervical glands. Dr. John Mac-

kenzie has more recently reiterated this fear in lurid colors, and now I find that Dr. Chevalier Jackson also expresses his conviction that we subject our patient to some risk in the removal of a specimen "a week or more" before radical operation. In reply to this I venture to say that, with our perfected microscopic methods, no week or more need elapse before we receive the verdict of the microscopist; and whilst quite agreeing that the local growth of cancer may be stimulated by local interference, I cannot from my own experience bring myself to believe that the few days which must elapse between the intralaryngeal removal and the report of the microscopist are likely to bring about any important deterioration of the local conditions, whilst the fear of local autoinfection of previously healthy parts in the larynx or of metastasis elsewhere is equally little justified by practical experience gained hitherto.

In saying this it is presumed, of course, first that the intralaryngeal removal of a fragment is always to be carried out by expert hands, and that undue irritation of the growth and unintentional wounding of previously healthy parts are being avoided, and, further, that the rule laid down by Dr. Newman twenty years ago is strictly adhered to—namely, that the probatory intralaryngeal removal of a part of a suspected growth ought only to be undertaken after the patient has formally consented to immediate radical operation in the event of the microscope proving the malignancy of the tumor. Both these preliminary conditions are most essential.

The second point on which I wish to speak in connection with this question is one of much greater practical difficulty than the one just mentioned. Supposing that one had to deal with a suspicious growth, situated either near the anterior commissure and threatening to invade the other side of the larynx, or, worse still, situated near the arytenoid cartilage, in dangerous proximity to the posterior wall of the larynx, and supposing, further, that the microscopic evidence after examination of an intralaryngeally-removed fragment was of a negative character, what ought one to do? In accordance with my own rule quoted above, most operators nowadays would, I think, nevertheless proceed at once to radical operation, considering it the smaller evil of the two to perform a thyrotomy, where such was possibly not required, than to wait too long and thereby to expose their patients either to the

removal of both vocal cords, with subsequent complete loss of voice for the rest of their lives—namely, if the suspected growth in the anterior commissure should after all have turned out malignant, and should meanwhile have passed over to the as yet healthy other vocal cord; or, worse still, to total extirpation of the larynx—namely, if the growth, which ultimately proved to be malignant, had passed on to the posterior wall of the larynx.

Against this practice, however, it may be argued—not without some show of reason—that it was hardly fair to avail oneself of the testimony of the microscope if it spoke in favor of one's own contentions, and to brush it aside if it differed from them.

Moreover, if after all the growth should prove to be innocent when removed by thyrotomy and microscopic examination of its whole structure, the surgeon would undoubtedly have exposed himself to the accusation that he had not only performed an unnecessary operation, but that he had done so in the face of the evidence of the microscope.

Supposing, on the other hand, that he had removed such a growth on the strength of naked-eye examination only, and that subsequent microscopic examination had proved it to be benign, he would not only have laid himself open to the first part of the same reproach—namely, that he had performed an unnecessary operation; but he might be charged, and, indeed, very likely would be, with having omitted an important method of investigation before undertaking a more or less serious operation.

Supposing, finally, that, strong as his clinical apprehensions were, he had yielded to the negative evidence of the microscopic examination of an intralaryngeally-removed fragment, and had waited too long for confirmatory evidence, he certainly, when in the course of events the growth turned out to be malignant after all, and now too much advanced to be dealt with by simple thyrotomy, would have to reproach himself that he had not had the courage of his opinions, and had thereby exposed his patient to the risks of a much bigger mutilating operation, the final results of which are not nearly so satisfactory as those of thyrotomy.

You see, gentlemen, from my enumerating these contingencies, that whatever course you may follow there are drawbacks attached to each of them, and that whatever you may

do or may not do, you are apt to expose yourself, while acting with the best of intentions, to serious recriminations.

Nor must you believe that the contingencies I have just enumerated are merely theoretical, and not likely to come within range of practical politics. Twice within recent years have I myself experienced their unpleasant reality, and the irony of fate has willed it that fault should have been found with me for diametrically opposite reasons. In the first case, which I communicated so far as it was then in existence at the meeting of the British Medical Association at Swansea[16]. I was denounced because, firmly convinced as I was that the histologist's favorable report of a growth removed by thyrotomy was erroneous, I had in order to spare the patient harassing doubts given an evasive answer to his question anent the microscopic finding.* The second case was that of a subglottic, apparently malignant, rounded smooth tumefaction, from which it would have been impossible to remove intralaryngeally a fragment sufficiently large for microscopic examination without causing severe local irritation. After the performance of thyrotomy it was found that the tumefaction was due to an obscure infective inflammation. I, of course, informed the patient of this fact. The result has been, I am told, that I am now accused of having performed a perfectly unnecessary operation!

While there are thus great and undeniable difficulties, the course one ought to follow seems to me clear enough.

Seeing the fact that errors in diagnosis are occasionally made by those who have had the largest experience, and this sometimes even in cases in which there did not appar to be any particular diagnostic difficulties, I think it is our plain

*The further history of this case is as curious as was its beginning. The patient after leaving me put himself under the care of Dr. Greville MacDonald, who has kindly informed me that he removed with forceps large masses of the recurrent growth. This was pronounced by Mr. Shattock, who had declared the original growth an innocent papilloma, to be a papilloma in which a carcinomatous change was beginning. Mr. Watson Cheyne, however, to whom the microscopic preparations were also submitted, considered the diagnosis of carcinoma not proven. The patient then for a time refused to submit to any further treatment. Ultimately Mr. Cheyne had to perform tracheotomy in a great hurry, because the growth nearly filled the larynx and almost choked the patient. The tracheotomy was followed by another thyrotomy, also performed by Mr. Cheyne, last March. Neither macroscopically nor microscopically was any evidence of malignancy found. Since then no recurrence so far appears to have taken place.

duty not to omit the employment, whenever possible, of any recognized method that may be helpful in securing the diagnosis. Such a method certainly is the microscopic examination of intralaryngeally-removed fragments, provided that it is not approached with an exaggerated sense of its infallibility. Considering the fortuitous character of the intralaryngeal removal, and the fact that neoplasms are not by any means always uniform in their structure, the result of the examination may certainly be inconclusive, and sometimes even directly misleading. In addition, it must not be overlooked that the interpretation of the appearances seen in a microscopic slide is, after all, a matter of individual judgment, and liable in not a few cases to the same errors to which clinical examination is exposed. In proof of this I need only remind you that often enough the opinions of various microscopists to whom one and the same slide is submitted, diametrically differ from one another. The patient ought, therefore, to be in all cases given a brief and fully intelligible explanation of the state of matters, and ought to be plainly told that the evidence of the microscope was only conclusive if proof of a distinctly malignant histologic type, such as squamous carcinoma, was found; but that if the evidence were negative this did not by any means dispose of the clinical fears which were entertained in his case. It ought also, as already mentioned, to be made a *sine qua non* that in the event of the microscopic examination corroborating the clinical fears, the patient should consent to immediate radical operation.

Such a course in those cases in which the probatory removal of a fragment is possible at all without gravely irritating the growth—which is, I repeat, in a large proportion of cases coming under my observation not possible—will satisfy the surgeon's conscience, and will protect him against unjustified recriminations made afterwards with regard to his mode of procedure. In not a few instances, to conclude from my own experiences, the patient will, after such an explanation, declare himself satisfied with the clinical evidence, particularly if a second independent opinion should have been taken and should have agreed with that of the first adviser. Anyhow, it will not be possible for the operator to be charged with the omission of the employment of a valuable diagnostic method of which he should have availed himself.

Such is my present attitude in this truly important ques-

tion, and I shall look forward with great interest to the opinions thereon which will no doubt be expressed in the subsequent discussion.

With this hope I leave the question of diagnosis and come to that of therapeutics. During recent years attempts have been made to combat laryngeal cancer by other means than surgical, and such widely different methods as injections of a preparation of the *Bacillus neoformans* (Doyen), the *x* rays, and trypsin injections have been laid under contribution for that purpose.

The injections with Doyen's serum, which Dr. Scanes Spicer has recently employed in several cases of malignant disease of the throat, mouth, and larynx[17], appear in that observer's opinion to favorably modify the symptoms and apparently retard the progress in certain instances, without, however, effecting a cure, while in other cases no benefit was received. Sheppergrell[18] states that in a case of laryngeal cancer treated by himself with the *x* rays a cure was obtained. In this case, however, it is not stated that a histologic examination of the growth has been made, and it is therefore impossible to say whether the growth was really of a cancerous character. One isolated cure is claimed in a case treated with trypsin injections by Dr. Clarence Rice[19], although the author is careful to state in the subtitle of his paper that the case thus treated was "supposed" to be carcinoma.

In the interest of our patients it seems but right to express a hope that the further study of the alleged influence of trypsin upon the cancerous process will be allowed to remain in the hands of the medical profession instead of such uncertain cases being sensationally claimed—as Clarence Rice's has been—as "cancer of the larynx cured by trypsin." We shall all most heartily welcome any method by which the scourge of cancer may be successfully combated otherwise than by operation, but the millennium has not yet come to pass, and there cannot be the slightest doubt that at the present moment our only justified hope of curing the disease in any given case consists in the growth being eradicated by surgical means at the time when it is still purely local.

Of the operations which come into question for that purpose I shall more particularly dwell upon thyrotomy and total extirpation of the larynx, while the intralaryngeal method, subhyoid pharyngotomy, and partial extirpation will on this occasion be dismissed with very few words.

With regard to the intralaryngeal method, instead of repeating the arguments which I have on many occasions brought forward against it, I prefer telling you what has quite recently been stated on this point by a man equally distinguished as a general surgeon and as a laryngologist, Professor Paul von Bruns of Tübingen. He says[20]:

"The intralaryngeal operation is recommended by some laryngologists (Fraenkel, Jurasz, Bresgen, Krieg) as the least dangerous interference with regard to life and voice in suitable cases of small cancers situated in accessible positions. Baginsky quite recently goes so far as to state that the external operation is only to be employed in the majority of laryngeal cancers.' B. Fraenkel has collected from his own practice and that of others a number of cases in which after laryngoscopic operation the cure has lasted at least the triennium generally accepted for carcinomas. Thus, it is true, the possibility of cure by the intralaryngeal method has been proven, but this is an extremely rare exception, which demands the concurrence of numerous favorable circumstances, for the large number of unsuccessful attempts is of course nowhere registered. By such attempts, however, a more rapid growth of the neoplasm may be promoted, a favorable time for external operation missed, and its chances materially deteriorated. From this point of view, which is shared by well-known laryngologists, such as Schrötter, Q. Chiari, Moure, and Semon, I consider the employment of the intralaryngeal method in laryngeal carcinoma as insufficient, and one to be rejected, because, as a rule, it only damages the patient. I have seen sad examples of this. Kocher point-blank declares that intralaryngeal attempts at operation in suspicious laryngeal tumors are 'faults of art.'"

With this opinion I thoroughly agree.

The next operation to be considered is thyrotomy, of which it may truly be said that not only men and books but also operations have their fates. At first employed in unsuitable, because much too far advanced, cases; then, as a natural consequence, rejected and absolutely condemned; then remaining in abeyance for a number of years; then resuscitated through the perspicuity and courage of Mr. Butlin; then quickly gaining the upper hand in this country, and justly considered as the standard operation for early cases of intrinsic laryngeal cancer, while still, with few exceptions, looked at askance by sur-

geons and specialists abroad; and only quite recently and slowly gaining its proper position on the European Continent and in the United States—such has been in briefest possible outline the history of thyrotomy during the last quarter of a century. Even now I regret to say that I learn from a paper read only last spring at the meeting of the South German laryngologists at Heidelberg that, "in order to obtain a lasting cure," a number of German surgeons remove the whole larynx even in unilateral cancer of the larynx and reject thyrotomy for cancerous new growth as an "insufficient interference."

It is an ungrateful and, indeed, impossible task to convince people who will not be convinced; and, with regard to such, one's only consolation is that truth will prevail over their theoretical objections. Those, however, who approach this, as other questions, without bias will, I venture to hope, be convinced of the efficiency and sufficiency of thyrotomy by the following facts derived from my own personal experiences:

From October 10th, 1878, until December 31st, 1906, I have seen in private practice 212 cases of malignant disease of the larynx. Of these, 136 were intrinsic and 76 extrinsic or mixed. No less than 177 occurred in men, and 35 only in women. Of the latter, again, in 12 cases only was the disease situated inside the larynx, while in 23 it was extrinsic, occupying in 18 cases the pharyngeal aspect of the cricoid cartilage.

I have already, in 1894, drawn attention to these startling proportions, which have not changed in my subsequent experiences; and I need not repeat what I said on that occasion, except that the question of the disparity between the sexes and of the localization of the disease in women certainly deserves serious consideration on the part of those engaged in the study of the etiology of cancer. Apart from the bare facts just mentioned, I regret that my own experience does not assist in elucidating these mysteries. Neither syphilis, nor abuse of alcohol or tobacco, nor hereditary taint, nor excessive voice use could be accused in the large majority of my male patients as having played a role in the production of the disease. It remains equally inexplicable why in my series the proportion of extrinsic and intrinsic cases should have been practically the reverse in the two sexes, there having been 124 of intrinsic and 53 of extrinsic in men, against 12 cases of intrinsic and 23 of extrinsic in women.

My experience since 1894 with regard to age again confirms

my statement made in that year, namely, that the thirty years of life between 40 and 70 furnish the overwhelming majority of all cases of malignant disease of the larynx coming under observation, but I have seen in the twelve years past since then more cases occurring in the decade between 60 and 70 than in that between 50 and 60. Three patients seen between 1894 and 1906 were 80 years of age; none were younger than 30.

While I have thus seen 136 cases of intrinsic laryngeal cancer, I have only performed thyrotomy—which is, in my opinion, the operation for this class of cases—in 33 cases of real or supposed malignant disease of the larynx. No conclusion must, however, be drawn from these numbers as to the proportion of cases of intrinsic laryngeal cancer suitable for thyrotomy. First of all, a large proportion of these cases were sent to me before thyrotomy had been reintroduced by Mr. Butlin; secondly, a very considerable number of my cases only came under observation in the course of consultation with other surgeons and specialists, who wished to have my opinion as to diagnosis and operation, and who, when these questions had been settled in favor of operative interference, performed the latter themselves. In the light of my present experience, I should certainly say that in *all* cases of cancer, still limited to the interior of the larynx, not too extensive, not too near the posterior wall, not yet infiltrating the laryngeal cartilages, thyrotomy ought to be performed unless there are urgent contraindications arising out of the general health of the patient. Advanced age is in itself by no means a contraindication if the patient is otherwise vigorous and free from serious organic complications. I have in nine cases performed thyrotomy in nen between 60 and 70, and in three in men over 70 with excellent results, and my very last case is that of a gentleman, aged 75, who nine days after thyrotomy for epithelioma of the larynx left the home in the best of health.

On the other hand, general debility, chronic bronchitis, advanced Bright's disease, diabetes, and similar serious organic mischief, of course gravely affect the prognosis.

Out of my 34 thyrotomies—in one of them the operation had to be repeated almost immediately after the first operation—undertaken in 33 cases for what seemed to be certain or very probable malignant disease of the larynx, in 8 the diagnosis was shown either to have been at fault or remained doubtful. Twice the disease turned out to have been tuber-

culous. Twice the tumefaction was stated by Mr. Shattock to have been of the nature of an infective inflammation. In 2 cases the diagnosis remained doubtful between fibro-sarcoma and innocent growth. In one case, already referred to in this paper, it is, in my opinion, still quite an open question whether the disease is of an epitheliomatous or papillomatous character, and in one case the subsequent history showed that the nature of the tumor had been that of an innocent papilloma. Three out of these 34 ended fatally, giving a percentage of 8.8 fatal results.

In one of the three fatal cases—reported before 1904—death resulted from an aggravation of a pre-existing bronchial catarrh in a very old man six days after operation; in the second case, death eleven days after the operation was the result of secondary bleeding and subsequent exhaustion in a very feeble old man of 76; the third case, in which death resulted twenty-seven hours after the operation from edema of the lungs, has already been alluded to in a previous part of this paper. It is a particularly melancholy circumstance that out of these 3 deaths 2 should have occurred in cases in which, according to the subsequent microscopic examination, the disease was not of a malignant character, but of the nature of an infective inflammation, and this fact adds, I should think, further weight to the view that microscopic examination of an intralaryngeally-removed fragment should whenever possible precede radical operation.

Of the cases of undoubtedly, that is, microscopically verified, malignant diseases of the larynx, which were 25 altogether, 1, as just mentioned, died, and 24 recovered. In one of them the operation had evidently been incomplete. A second thyrotomy was performed at once, with more radical removal of the neighborhood round the recurrent growth, and the patient has since (more than two years ago) remained perfectly well. In 4 cases recurrence took place. In 1 of these the patient died from cancer of the liver five years after the operation, the larynx and the cervical glands remaining free. This leaves, therefore, a percentage of 3 to 24 of cases of genuine local recurrence. In the first case recurrence took place nine months after the operation, and the patient, having refused further surgical treatment, died eighteen months after the operation. In the second case the first recurrence took place four months after the operation, when hemilaryngectomy was performed.

A year afterwards this had to be followed by total extirpation of the larynx on account of metastasis in the cervical lymphatic glands, which were inseparably bound up with the larynx, the interior of which, however, this time had remained perfectly healthy. Death ensued from coma twenty-four hours after the operation, which was performed by Professor Gluck. The patient had been suffering from advanced chronic nephritis. In the third case recurrence took place eleven months after the operation, and hemilaryngectomy has been performed too recently to say anything about the final result.

Deducting, then, from these 24 cases one too recently operated upon to be of any value for statistical purposes concerning freedom from recurrence, and one in which, five years after the operation, the patient died from cancer of the liver, the larynx and cervical glands remaining free, we find that out of 22 cases of undoubted malignant disease of the larynx, a genuine local recurrence took place in 3 cases. This gives a percentage of 13.6 recurrences. If the case in which death from cancer of the liver took place five years after the operation be included amongst the recurrences, we find 4 recurrences in 23 cases, or 17.4 per cent recurrences.

With regard to the case just referred to, however, I wish to observe that, whether that occurrence ought to be looked upon as a genuine metastasis, or whether the same obscure agencies which caused the malignant disease in the first instance produced it again anew and independently of the first manifestation, must remain an open question in the absence of a *post-mortem* examination. The possibility just named is not so far-fetched as might be thought. A case has been reported by Gluck[21] in which, after extirpation of a squamous-celled laryngeal carcinoma, a cylinder-celled carcinoma, from which the patient died, developed two and a half years afterwards in the transverse colon. In this case, at any rate, the idea of a genuine recurrence is excluded, and one cannot think of anything else but of a genuine fresh production of another form of malignant new growth.

The last category to be considered under this head, that is, the cases in which no recurrence took place, or in which, either after incomplete operation or after recurrence, lasting freedom was obtained after further operation, demand some special consideration before their ultimate result can be expressed in figures.

The determination, in cases of operation in any part of the body for cancer, of the exact period after the lapse of which the patient may be considered as "cured," is, of course, purely conventional. However late a date within the bounds of reason may be chosen, it will always be easy to point to some isolated cases recorded in literature in which recurrence, local or metastatic, took place after an even longer interval. All that can be said, therefore, is that when speaking of a "cure" in cases of operation for cancer, one means that the period has been passed within which, according to general experience, recurrence, if at all, usually takes place, and that the patient might now be reasonably expected to enjoy lasting freedom from the disease. In accordance with this ratiocination, by common consent the period of three years is now considered to cover the time of danger of recurrence, and statistics of operations for cancer are usually constructed upon this principle. Ten years ago, however, I pointed out that, owing to the peculiarities of the lymphatic supply of the larynx, intrinsic cancers of that part occupy an exceptionally favorable position with regard to the question of recurrence after radical operation, and that when one year has passed without recurrence, the patient may be justly regarded as having passed the critical period. At present, after ten years' further experience, I stoutly maintain the position then taken. It has been shown that in not a single one of the cases in which I performed thyrotomy recurrence took place after the lapse of the first year, and I shall therefore make that period the basis of the following calculations. I do so, not for the purpose of including a few more cases of cure in my tables, but because I know from practical experience how happy the patients are when they are told after the lapse of one year after the operation that they may now, humanly speaking, be considered out of danger of recurrence, and because I think it is right to give them that comfort. Subtracting, therefore, from my 25 cases of operation by thyrotomy for undoubted malignant disease of the larynx, 1 case in which death occurred from the operation, 3 cases in which local recurrence occurred within the first year after the operation, and 1 case too recently operated upon to be included in this list, but including on the other hand 1 of incomplete operation in which after the second thyrotomy a lasting cure was effected, we have 20 cases of lasting cure remaining, that is, exactly 80 per cent. If, however, the case

be further deducted in which five years after the operation the patient died from cancer of the liver, 19 out of 25 cases, that is, 76 per cent of lasting cures would be obtained. Truly an extremely pleasing result, which I think favorably compares with the results of radical operation for cancer in any part of the body.

The duration of the cure in each individual case from the date of the operation to December 31st, 1906, has been as follows:

1 case —over 15 years.
4 cases—between 10 and 15 years.
4 " —between 5 and 10 years.
2 " —over 4 years.
3 " —over 3 years.
2 " —over 2 years.
1 case —just 2 years.
1 " — 1 year and 10 months.
1 patient died 5 years after operation from pulmonary embolism.*
1 patient died 4 years after operation from pneumonia.*

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The vocal results are equally satisfactory; voice surprisingly good in 11 cases, good or fair in 5, weak or reduced to a whisper in 4. In not a few instances both vocal cords had to be removed.

Finally, in this connection, I wish to mention as an additional advantage of thyrotomy that even in the cases in which either the operation has not been complete, or in which unfortunately genuine recurrence has taken place, the operation does not bring us to the end of our resources, but that on the contrary, by a repetition of the operation, or by hemilaryngectomy, or by total extirpation of the larynx, a lasting cure may still be obtained, where the minor operation has failed.

With regard to the technic of the operation, I still adhere entirely to that described by me in 1894 in the *Lancet*, and only wish to recommend anew on this occasion the excellent shears for splitting the thyroid cartilage invented by my friend, Mr. Waggett. Various modifications of the technic, however, have been suggested, and Professor Paul von Bruns, who now, in accordance with the view generally held in this country, con-

*In both these cases recurrence was absolutely excluded.

siders thyrotomy as the "normal" operation for the early stages of laryngeal cancer, describes the following as his own method[22].

"Instead of general narcosis, half an hour to an hour before the operation an injection of scopolamin and morphin is given, and a solution of novo-cocaine is injected into the line in which afterwards the external excision is to be made, while after the larynx has been opened, the mucous membrane is painted with a solution of novo-cocaine and adrenalin, in order to abolish reflex cough and deglutitory movements, and to limit bleeding from the mucous membrane. If no graver hemorrhage is to be feared, previous tracheotomy and introduction of a cannula is avoided. With Kocher, I prefer the oblique position of the body, with the head hanging down, in order to more securely prevent the aspiration of blood; this position also protects against the invasion of the pharyngeal phlegm—which is often secreted in large quantities—into the larynx, and which has otherwise to be prevented by plugging of the lower parts of the pharynx. The division of the cartilages extends throughout the larynx into the trachea, in order to give sufficient space. When the cartilaginous halves have been drawn asunder, an incision—if necessary under artificial illumination by means of a small electric lamp—is made all round the tumor down to the perichondrium and close to the cartilage. The bared surfaces are, if necessary, burnt with the galvanocautery, and iodoform is rubbed into them. The introduction of an iodoform gauze tampon is omitted. Finally the halves of the thyroid cartilage are brought together, and the upper part of the external wound is closed, while the lower part in the region of the trachea remains open, and is only loosely plugged. No cannula is introduced."

This method differs in various essential points from that in general use in this country, particularly in the avoidance of general narcosis and of the use of Hahn's or some other form of tampon cannula. Seeing that Professor von Bruns speaks from practical experience and has obtained good results by the method he describes, it would seem captious to object to it from a theoretical point of view. I fully see the advantages of placing the patient in an oblique position with the head hanging down, and thereby avoiding the introduction of a cannula, even during the operation, and shall give this method a trial.

I cannot help doubting, however, the advisability of employing adrenalin in painting the mucous membrane after splitting the larynx. Cocain fully suffices for that purpose, and the employment of adrenalin, as I have personally experienced in one case, increases the risk of secondary parenchymatous hemorrhage. Altogether, I must say that the results obtained by the old method certainly are satisfactory enough not to necessitate modifications, although I by no means wish to imply that the technic generally followed in this country must necessarily be final.

I have only to add one word about the question of rectal etherization, which I see from the discussion following Dr. Chevalier Jackson's paper has again been proposed as a convenient mode of administration of the anesthetic in cases of thyrotomy, as it dispensed with the anesthetist's encroaching upon the narrow field of operation. That it does so is no doubt true, but it seems to have been forgotten that I fully described in my paper in the *Lancet* in 1894 a very lamentable case of death after hemilaryngectomy, in which the fatal issue was beyond a shadow of doubt due to ether poisoning after rectal administration of that anesthetic. Not only the intestines and the stomach, but the bronchi, large and small, were intensely congested, and showed numerous large and small ecchymoses and free hemorrhages on their surfaces. For further description of the details I must refer to that paper, but I wish to say that nothing would induce me, after this extremely sad experience of my own, to give that method a fresh trial.

Of the next operation on our list—namely, hemilaryngectomy, or partial extirpation—I have to say but a few words. It is obvious that this operation will become rarer in proportion to the diagnosis of intrinsic cancer being more generally made at an early stage of the disease. In fact, it is likely that ultimately it will be limited to those cases of intrinsic cancer which come under observation only at a period when the disease has already invaded the cartilaginous framework, and to a few exceptionally favorable cases of extrinsic cancer. Quite in conformity with these general considerations I have only had occasion to perform the operation in five cases. In one of them—just referred to—death occurred from ether poisoning. The other four patients recovered. In one of them, in whom thyrotomy had been performed previously, the operation

is of quite recent date. The results of the three remaining ones were not satisfactory; in one it is doubtful whether recurrence took place, although this is not probable. The patient died suddenly ten months after the operation from the bursting of an abscess in front of the trachea. In the second case recurrence took place in the cervical glands, the larynx remaining free, and death ensued fifteen months after the operation, the patient refusing further operative interference. The growth had been pronounced by Mr. Shattock to have been highly malignant, and the prognosis was bad from the first. At the time of the operation the thyroid cartilage was already invaded. The cervical glands were apparently not involved at the time of the operation. In the last case—already referred to—in which the patient was at first operated by thyrotomy, and afterwards by hemilaryngectomy, recurrence took place, about ten months after the last operation, in the cervical glands. Professor Gluck removed not only the cervical glands, but the larynx *in toto*, as its outside was inseparably connected with the affected glands. The patient never regained consciousness, and died about twenty hours after the operation had been completed.

My results of hemilaryngectomy are, therefore, far from satisfactory, and, as the outcome of my experience, I should certainly recommend removal of the corresponding cervical lymphatic glands, even if they are apparently not invaded, in cases in which infiltration of the thyroid cartilage renders hemilaryngectomy necessary. I have nothing to add to my previous description of the technic of the operation, except that in some cases it may be possible to safely leave a zone of the affected cartilage, either in its upper or in its lower region, behind. This materially assists in the prevention of stenosis.

With regard to subhyoid pharyngotomy, I have equally little to add to my previous description. I see from Professor Paul von Bruns's latest statistics of all subhyoid pharyngotomies performed for laryngeal cancer since 1890, that in 16 per cent only a cure lasting from one to three or more years had been obtained, that in 20 per cent recurrence took place, and that the mortality of the operation was no less than 40 per cent. Quite apart from the fact that it can be employed only in a very limited number of cases, namely, in those in which the disease is situated near the upper aperture of the larynx, the danger of the operation is so great as to give little encourage-

ment for its adoption, particularly in view of the fact that equally good access to the growth can be obtained by laryngotomy.

I myself have performed subhyoid pharyngotomy but once for malignant disease of the larynx[23], and have met with the same disappointing experiences as others have done, namely, that the patient died on the fourth day after the operation, probably from sepsis.

The last part of my task, namely, the discussion of total laryngectomy, I approach, I do not mind confessing, with some trepidation. Experience has taught me[24] that thoroughgoing laryngectomists, with some exceptions, of which Professor Gluck is the most praiseworthy example, are apt to regard everyone who does not go to the entire length of their own convictions, as an enemy, and to treat him accordingly. Nevertheless, this shall not deter me from reiterating on this occasion the views, which I have consistently upheld since first total laryngectomy was discussed in public, and which may briefly be defined as being about equidistant from prejudiced antagonism to, and from injudicious adulation of, this operation. Like every sane person I unconditionally admit the legitimacy of any operation which saves, or even only appreciably prolongs a fraction, however small, of lives otherwise irretrievably lost, and I thus unreservedly recognize the justifiability of total laryngectomy. I gladly register that the formerly terrible mortality of the operation has through the progress of the technic been very much reduced of late years, and, finally, I do not doubt that a few of the patients who have survived the operation for any length of time have been and are quite content with their lot. But when thus much has been stated, I honestly believe that all has been said that could possibly be adduced in favor of total laryngectomy, and I cannot bring myself to regard the question of the kind of life the patients have to lead after a successful operation, and the question of the frequency of recurrences, as so secondary and comparatively unimportant as is certainly being done by the more militant faction of the enthusiastic advocates of the operation.

Total laryngectomy is beyond the shadow of a doubt one of the most mutilating operations in surgery. It does away with speech in its ordinary sense, for of the many ingenious phonatory contrivances which have been invented and recom-

mended, I have never seen a patient avail himself for any length of time. He rather puts up with the pharyngeal whisper, which in some cases is audible at a distance, or communicates with the outside world in writing. In not a few cases to this loss of speech is added permanent difficulty in swallowing, which compels the patient to take his meals by himself or even to be fed artificially. All this more or less shuts out the patient from the company of his fellow men, partly from instincts of his own, partly from being driven to observe that he is an object of pity mixed with horror to others. He therefore, usually shuns society and becomes a recluse. I do not wish to be accused of exaggeration, and I therefore emphatically repeat that no doubt some patients may lead a more amenable existence. Personally, however, while often enough meeting in society and in public places persons who have been successfully thyrotomized by others as well as by myself, I have never seen a patient whose larynx has been removed, elsewhere than in the meeting room of a Society, in which his case was demonstrated as a success; or in my own consulting room, when a recurrence has taken place. This, I believe, is also the general experience of others, and, in view of this fact alone, the lightheartedness with which by some total laryngectomy is recommended and practiced when less serious interference would have fully sufficed, appears to me not only regrettable, but directly reprehensible.

In addition, there is that extremely serious question of recurrence after total laryngectomy, of which I am fully convinced we have not yet sufficient modern data to build a reliable opinion upon, and which yet is so extremely important when the question as to whether total laryngectomy ought to be undertaken or not in a given case comes to be considered.

The only modern reliable statistics, so far as I know, of any single operator who has had considerable experience of his own are those of Dr. Chevalier Jackson. He states[25] that out of 8 total laryngectomies performed by him 3 were hemilaryngectomies followed by recurrence and total removal. One of the patients lived seven years after, when he died from cancer of the stomach; another lived three years without recurrence, dying of cerebral hemorrhage; and the third died eight months after from alcoholism. Of the remaining 5, 3 had recurrence within the year, 1 apparent cure was lost to observation after a year, and 1 is too recent to record.

Out of the 3 prompt recurrences there was 1 metastasis in the lungs, liver and pancreas. Thus out of 8 laryngectomies no absolute ultimate cures could be claimed in the author's own opinion, although 3 were apparently cured at the end of one year. I entirely agree with Dr. Chevalier Jackson when further on he states, with regard to the case in which seven years after removal of the larynx cancer of the stomach occurred, that such a recurrence indicates a vulnerable soil more than repullulation of the primary process.

I have for the purposes of this paper applied to Professor Gluck, and requested him to give me if he could a summary of all his experiences with regard to total laryngectomy. In reply he regrets being unable to comply with my wish, on account of the difficulty of obtaining replies from the very large number of patients from a distance upon whom he has operated. He at the same time states that, while formerly his material had mostly consisted of cases in which the disease was limited to the larynx, more recently, in consequence of the progress of technic, the cases in which the pharynx, esophagus, and tongue were affected together with the larynx had considerably increased, the operation being thereby, of course, made more serious still. All the same, remarkable results had been obtained, and he could assure me that quite a number of patients in whom not only total extirpation of the larynx but also resection of the pharynx had been performed, had survived the operation for many years in a good state of health. He also promises to try and ascertain for a future occasion the total results of his experiences.

Professor Paul von Bruns apportions, in a statistic of all total laryngectomies performed since 1890, the proportion as follows:

Cure lasting more than three years	10	per cent
Cure lasting one to three years	16.6	per cent
Cure lasting less than one year	28.9	per cent
Recurrence	24.5	per cent
Death owing to operation	19	per cent

Personally, I can only say that what I have seen of total extirpation of the larynx has been anything but encouraging. I have never performed the operation myself, but have confided those few of my patients who, after full exposition of the situation, decided upon submitting to the operation to

most experienced hands. One of my patients died from the operation itself, as already stated; none of the other three has survived the first year after operation. Not wishing to make sensational statements, I will only say that in all these cases the life the patients had to lead from the operation until their release by death was extremely sad. Indeed, whenever I have seen these patients a few months after the operation, with recurrence fully established, the question has forced itself upon me with ever increasing emphasis whether such a result was worth the mental anxiety, the physical suffering, the heavy expense, and the blighted hopes necessarily connected with the course that had been taken. All the same, I have kept before my mind that probably my personal experience has not only been small but exceptionally unfortunate, and that after all there remained the one stern fact that those patients' lives would have anyhow been irretrievably lost if no operation had been performed at all. I have, therefore, never dissuaded a patient, whose case seemed to offer a reasonable chance, from undergoing the operation, but have considered it my duty to lay an impartial statement of the alternatives of letting matters take their course and of having total laryngectomy performed before the patient, and in no way to influence his decision. Such a line of action appears to me the more required in view of the unfortunate fact that in a certain proportion of cases so-called cured patients have committed suicide.

Unfortunately, until a specific has been discovered which cures malignant disease without having recourse to the knife, total laryngectomy will remain a cruel necessity in cases of extrinsic cancer of the larynx. From my own statistics above quoted, however, it will have been seen that fortunately the extrinsic variety is by far the rarer of the two by which the larynx may be attacked; and I feel sure that I shall have the sense of this meeting with me when, in conclusion, I express an ardent hope that every practitioner should endeavor to diagnose the intrinsic variety at so early a time that thyrotomy will suffice, not only to save the patient, but also to help him to an amenable existence afterwards. Fortunately I can say that, to conclude from my own experiences, this desirable improvement in early diagnosis has made material progress during the last few years. Still much remains to be done in this respect, and I cannot better end my introductory remarks

than by the expression of a fervent hope that this discussion may give a fresh impetus to early diagnosis and immediate thorough removal of the disease by thyrotomy in cases of intrinsic cancer of the larynx.

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22. Loc. cit., pp. 245, 246.

23. See my paper in the Lancet, 1894, tables, Case 7.

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XIV.

THE IMPORTANCE OF CORRECTING PATHOLOGIC CONDITIONS OF THE NOSE AND THROAT IN PATIENTS WHO HAVE INCIPIENT TUBERCULOSIS.

By Willis S. Anderson, M. D.

DETROIT, MICH.

Pulmonary tuberculosis is a disease which attacks persons of lowered vitality. The lowered vitality results from improper or insufficient food, unsanitary surroundings, intemperance or other vicious personal habits, overwork, mental worry, and disease. Tuberculosis does not attack the strong and vigorous. The tubercle bacillus finds lodgment in tissues that are below par.

The problem to be met in the treatment of this disease is to increase the resistence of our patients. In the absence of any specific agent for this purpose, we rely mainly upon hygienic, dietetic and climatic measures.

The value of fresh air and out of door life is now generally recognized. It is customary to advise patients to live out of doors even in the coldest weather, but few physicians think of examining the nostrils of their patients to see whether it is possible for them to obtain the benefits of fresh air by normal breathing.

A carefully regulated diet may be prescribed with digestants and stomachics to encourage the stomach to perform its function; but if the tonsils are hypertrophied, with septic accumulations in their crypts, or if there is muco-pus in the nose or sinuses, we know that digestion will be impaired. This impaired digestion may arise from the absorption of septic material from the nose and throat, or from the swallowing of the secretions.

As an aid in the treatment of tuberculosis, we should increase the bodily resistance of our patients by restoring to as near normal as possible any defective organ. The failure to appreciate the importance of this rule has lessened the chances of recovery of many tuberculous persons.

If organic defects are found after a thorough examination of a patient, judgment is required to determine what bearing they may have on the pulmonary condition and general nutrition. Organs remote from the respiratory tract, though pathologic, may have little, or no effect, on the local condition. The correction of some lesions might necessitate more risk, or a longer period of close confinement, than would be warranted in certain cases. There is such a close relation between the upper respiratory tract and the lungs, that any abnormal condition of the nose and throat should receive careful attention.

We shall study these abnormal conditions under the following heads:

Pathologic Conditions of the Nose, Nasopharynx and Pharynx.—The lesions in the nose may be grouped into two classes: First, obstruction to free nasal breathing; and second, any condition which gives rise to accumulations of mucus, or muco-pus in the nose or sinuses.

The study of the physiology of nasal breathing in the lower animals gives us many hints as to its importance in man. We know that animals are very dependent upon nasal breathing, which, if interfered with, leads to serious disease or even death. Man has greater powers of adaption, therefore nasal obstruction does not produce the serious immediate effects that are noticed in the lower animals. There is difference of opinion as to what constitutes free nasal breathing. Air may be drawn with effort through nostrils that are not free for ordinary quiet respiration. A cursory examination of the nose may show a fairly free passage, but a more careful examination may reveal narrowness at one or more points. We must remember that the breathing capacity of the nose is measured by its narrowest point. The current of air passes in a curved direction, upward and backward to enter the nasopharynx. A comparatively small obstruction in the upper portion of the nose or nasopharynx, will interfere with the current of air in its passage to the lungs. While such an obstruction does not prevent the forcible drawing of air through the nose, it does interfere with normal, quiet breathing. Many patients claim to have free nasal breathing, when in reality they breathe all the time partially through the mouth.

If we notice in public places how persons breathe, a considerable number will be observed with the lips more or less parted; this indicates that a certain amount of respired air is

entering through the mouth. The majority of these individuals do not realize that they are mouth breathers. I have asked many patients to try the experiment while walking along the street, of keeping their lips closed and noticing whether they could breath comfortably through the nose. In many instances after walking a block, or less, they will open their mouths a little to obtain more air. After taking several breaths they can close their mouths again for a few moments. While these patients can breathe through their nose, the space is not sufficiently free to give them all the air necessary. This partial mouth breathing is not normal, and is an important factor in the etiology of the so-called catarrh of the laity. These patients are subject to colds which may be localized in the nose and throat, or involve the lower respiratory tract as well. They are frequently hoarse and have a dry, irritable throat, which is more marked in the morning.

In examining the lungs of persons who have nasal obstruction, I have noticed that there is a diminution of breathing, more marked at the apices, or what is sometimes spoken of as "lazy lungs." It is not always easy for the physician to decide whether a given individual has proper breathing space or not. Several examinations may be necessary before this point can be determined. The writer suggests a certain routine in order to determine this point.

While getting the history, and without calling the attention of the patient to his breathing, notice carefully if the lips are a little separated and if some air is entering through the mouth. Ascertain if the patient notices an alternate obstruction of the nose at night, or in damp, changeable weather; if in the morning the throat is dry from mouth breathing; and if the voice lacks resonance, or has a nasal quality. An examination of the nose should then be made to estimate the amount of breathing space. After this preliminary examination the soft parts should be shrunken by the use of cocain and a suprarenal preparation. While shrunken, notice whether there are any points that are especially narrow. By examining the turbinals before and after they are contracted, an estimate can be made as to how much of the size is due to intumescence and how much is due to hyperplasia, or to enlargement of the turbinated bones.

The conditions to be looked for especially are polypi, or other tumors; narrowing due to deviation of the septum; hyper-

trophy of the anterior or posterior ends of the inferior turbinals; and hypertrophy of the middle turbinals. The middle turbinate is often the offending member, and its importance as an etiologic factor in the production of nasal obstruction is frequently overlooked. It often causes intumescence of the inferior turbinal by interference with the circulation. In such cases it is useless to cauterize the inferior turbinal without removing the underlying cause of the intumescence. After all, it is the care and judgment of the examining physician which must finally determine the relative amount of nasal breathing.

An excessive amount of mucus, or muco-pus, may accompany nasal obstruction, and when present usually indicates involvment of one or more of the accessory sinuses. Nasal obstruction and improper drainage are the usual causes of chronic sinus involvement. Sinus disease is a menace to the health and comfort of a patient, and in itself lowers bodily resistance.

The nasopharynx is less frequently obstructed in adults than the nose, but there remains some hypertrophy of the tissues of the vault, or a granular condition, in those cases which had lymphoid hypertrophies in childhood. This causes an accumulation of thick, tenacious mucus, which is aggravated if there is nasal obstruction. Chronic follicular pharyngitis is frequently found in tuberculous patients. It causes an irritation, with a constant desire to clear the throat, and often a dry, irritable cough.

Diseased tonsils are a source of great danger to tubercular persons. There is now abundant clinical and experimental evidence that various infections enter the body through the tonsils. Infection has been traced in animals from the tonsils, through the lymphatics and cervical glands, to the bronchial and mediastinal glands. A submerged tonsil, with diseased crypts, is capable of doing as much, or more harm, than a large, hypertrophied tonsil. Tubercular tonsils are not rare, and tubercular cervical glands are very common.

We are indebted to Dr. George B. Wood, of Philadelphia, for many facts in reference to the lymphatic drainage of the faucial tonsil, and the infection of the tonsil by tuberculosis. He uses the term, "tonsillar lymph gland," to describe a lymph node, which is enlarged during tonsillar infection. It is situated external and slightly anterior to the internal jugular vein, and is imbedded in loose areolar tissue, containing more

or less fat.

Dr. Frederick A. Packard, in his Wesley M. Carpenter lecture on "Infection through the Tonsils," 1900, brought together many data, which emphasized the important relation between tonsillar and rheumatic affections. Many other observers have shown that it is just as important to appreciate the role that the tonsils play in the etiology of tuberculosis. Besides the danger of direct tubercular infection we have septic absorption from the diseased tonsillar crypts. This slow absorption often causes a slight elevation of temperature, general malaise and lowered resistance. Hypertrophied tonsils may interfere with free breathing or deglutition, and the exudate which accumulates in the crypts impairs digestion and gives a foul odor to the breath. Hypertrophy of the lingual tonsils is frequently found. The principal symptoms noticed are a dry, irritable cough, constant desire to clear the throat, and congestion of the larynx.

Tubercular laryngitis complicates about one-third of the cases of pulmonary tuberculosis. A laryngitis is usually a forerunner of this condition, and imperfect nasal breathing is an important factor in the production of a chronic catarrhal laryngitis. Even where the larynx is not tubercular we commonly have a congestion and a hypersensitive condition, which in itself gives rise to an irritable cough and huskiness of the voice.

The above conditions are easily recognized by those familiar with lesions of the nose and throat, but they are not often considered in their relation to the early stage of tuberculosis. A patient with incipient tuberculosis is particularly susceptible to atmospheric changes, because of the lowered resistance. They shudder at the thought of remaining out of doors during the winter season. If they do not breathe freely through the nose, the cold, dry air is drawn into the lungs through the mouth. This causes irritation and congestion of the mucous membrane, and is a positive handicap in a patient's struggle for life and health.

We ought to realize that a case of incipient tuberculosis is not properly managed unless nasal obstructions are removed, diseased tonsils carefully dissected out, and other lesions of the nose and throat corrected as far as possible. The methods used in the treatment of these conditions are familiar to all and need not be considered in detail, although a

few general points will be considered.

Fortunately local anesthesia is sufficient in nearly every case. If for any reason a general anesthetic is to be used, the added danger which comes from the anesthetic itself should be considered. The danger from cocain poisoning is so remote, if the drug is carefully used, that we can exclude it from our consideration. There is very little shock following operations upon the nose. If both nostrils are involved, the worse side can be attended to first, and a little time allowed for the patient to recuperate before the second side is corrected.

In suppurative sinusitis the cavities should be drained and washed out. The nasal route should be chosen. Several points ought to be considered before advising a serious sinus operation upon a tuberculous patient; first, does the sinus disease in itself threaten life; second, the probable amount of shock to a person already below par; third, will the after-treatment be long and tedious; fourth, can the patient's symptoms be relieved by washing out of the sinus regularly, without recourse to operation? If the above points are considered very few radical sinus operations will be justified upon a tuberculous patient.

Hypertrophied lingual tonsils should be cauterized with trichloracetic acid, the galvano-cautery, or removed with a lingual tonsillotome according to the severity of the condition. Hypertrophy of the follicles of the posterior wall of the pharynx should be cauterized by touching the elevations with the point of the galvano-cautery, or in mild cases with trichloracetic acid.

In the treatment of the tuberculous we ought to consider nutrition as the ability not only to digest and to assimilate food, but also to inspire normally a sufficient amount of fresh air to meet the demands of the body. As success or failure in the treatment depends upon nutrition, attention should be directed to the upper air tract to lessen air hunger. That air hunger does exist from nasal obstruction is proven by the effect upon the nutrition of children who have adenoids, by the impaired health in adults when the nasal respiration is below normal, and experimentally in animals where one or both nostrils have been closed.

Some of the symptoms noted in the more severe examples of obstruction may be ascribed to pressure, and the interference with the circulation in the brain; this is accounted for

by the free anastomosis between the vessels of the nose and the meninges. If this condition exists it is all the more reason why the local pressure should be removed. There is probably no difference of opinion as to the importance of the severer type of nasal obstruction, but the milder forms may be considered by some as unimportant. I feel that this is a mistake and that even the milder forms should be given careful attention.

I might cite cases to illustrate the value of the principles outlined in the above paper, but the reports would not be conclusive, as the correction of the lesions of the nose and throat has been supplemented in every case by careful hygienic, dietetic and medicinal treatment. I feel convinced from my own experience that the correction of abnormal conditions of the nose and throat adds materially to the chances of cure in tuberculous patients.

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XV.

COMPLETE CONGENITAL OCCLUSION OF THE RIGHT POSTERIOR NARIS.

By L. D. Brose, M. D., Ph. D.

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In a practice extending over twenty-five years I have met with but a single case of this nature, while Moritz Schmidt[1] states in his own practice he has never met with a case and had but one opportunity of seeing one, and that in the practice of a former assistant. During the past summer, while visiting the clinic of Prof. Killian, in Freiburg, his first assistant, Dr. von Eicken, told me of a case in their practice, occurring in a child less than three years of age, where both choanæ were wholly occluded, but thus far the parents had not consented to having an operation performed for its correction. In all, however, some fifty cases have been placed on record, but new cases are sufficiently interesting to be deserving of publication.

My patient, T. M., aged twenty-two years, and a resident of Oakland City, Ind., was sent to me January 29th, 1906, by Dr. Thomas M. Brown, because of a discharge of pus from the right nostril, with inability to breathe through this side of the nose. About three years ago he states he had the right upper first molar tooth extracted because of ulceration, and distinctly recalls that the discharge of pus from the right nostril has existed ever since. He has no recollection of ever having breathed through the right side of his nose. No other member of his family so far as he is aware has been similarly afflicted. The hearing is perfect in both ears and the general health has always been good. Syphilis is denied.

Anterior rhinoscopic examination showed a vertical ridge partially obstructing in front the lumen of the right nasal passage, with the presence of a yellowish-white purulent discharge, which we established as originating in the right maxillary antrum. A probe passed into the depths of the right nasal passage, was arrested at the posterior naris by a hard,

1. Die Krankheiten der oberen Luftwegen, 1894.

osseous feeling partition through which we were unable to find an opening. Closure of the left nostril necessitated breathing through the mouth. Posterior rhinoscopic examination disclosed a solid whitish partition, with a small central depression extending from the right palate bone across the nostril and uniting so intimately with the posterior portion of the bony septum that the line of articulation could not be detected. The retropharynx, Eustachian orifices and vault of the palate presented nothing abnormal. Fluids injected into the left nostril entered the retropharynx, while a similar injection into the right nostril was again returned without a drop entering the throat.

March 17th, 1906, under chloroform anesthesia, the following operative interference was undertaken at St. Mary's Hospital. The mouth was held open with a gag and then the index finger of the left hand inserted into the retropharynx to serve as a shield. A trochar was next passed into the right nostril and an effort made to perforate the obstruction near its center. Finding the resistance, however, at this point very great, search was made for a more yielding spot, and it was found above at the inner side near the base of the vomer. The opening made by the trochar was enlarged downward and outward with saw and chisel until a good sized rubber tube could easily be inserted. The hemorrhage was slight and the after-treatment consisted in the daily removal of the tube and cleansing of the nostril with a mild alkaline irrigant. Patient made an uninterrupted recovery and returned home wearing a piece of a number seventeen catheter, American scale, which at the expiration of six weeks he was to discard.

February 5th, 1907, he wrote me that he has long since left the tube out and is now able to breathe freely through both nostrils. The discharge of pus, however, from the right maxillary antrum still continues and he intends returning soon to have this corrected. According to Schroetter[2] the bony obstruction springs from the vertical plate of the palate bone, and so far as I was able to determine by posterior rhinoscopic examination and palpation in my patient, I am inclined to corroborate this statement. Hopman[3], however, thinks

2. L. Schroetter. Angeborenen knoechernen Verschluss der Choanen. Monatsschrift f. Ohrenheilkunde, etc., No. 4, 1885.
3. Hopmann. Ueber congenitale Verengungen und Verschluss der Choanen. Archives f. klin. chir., xxxvii, 2.

that originally there exists a high degree of stenosis of the choanal borders and this with deviation of the vomer and approximation of the internal pterygoid process of the sphenoid eventuates in total occlusion of the nares.

XVI.

INCORRECT NOMENCLATURE IN OUR LITERATURE.*

A HISTORICAL, CRITICAL DISCUSSION.

By Prof. Dr. H. Schwartze.

HALLE A. S.

In our otologic literature, not only the German but also the foreign, there have been in use for about two decades certain incorrect terms for operations, forms of diseases, and therapeutic aids. It is of interest to science, whose goal is always truth, to remove such incorrect designations. They cause mistakes in the mind of the coming generation, the more so as they are reproduced in some of the latest text-books for beginners in otology, and are thereby impressed upon wider circles of thought and more dispersed in otologic use.

I will confine my critical and historical discussion in this place to three incorrect terms: "Radical operation," "Bezold's mastoiditis," and "Hartmann's tympanic tube."

I.

"RADICAL OPERATION."

I do not remember who was the first to introduce this name into otologic literature for "the radical opening of the middle ear." It is well known, however, that I have fought for years against the retention of this entirely unsuitable expression. Independent of the fact that it is not exactly defined, and its varying definition must cause confusion, we should give up this term because the hope of obtaining by it a complete and lasting cure of the chronic suppuration is not always fulfilled, nor can it be. Through this proud name, the inexperienced physician and the patient obtain hopes that not rarely prove in vain. At least, both physician and patient expect our "radical operation" will be a radical cure of the suppuration. This, however, is not an invariable result, as experience has sufficiently taught us. Even

*Translated from the Archiv f. Ohrenheilk, Vol. LXX, Nos. 1 and 2, by Clarence Loeb, M. D.

if the wound of the patient discharged as "cured" is dry, and shows no suspicious places with dry crusts, but has a faultless appearance, and everywhere is covered with the desired reflecting, thin epidermis, still relapses can occur which can cause subsequent lethal intracranial complications in spite of the apparently completely successful "radical operation."

So we must designate as an illusion the assurance frequently given that the patient will be freed by the "radical operation" from the danger of fatal termination of his aural disease, even when complete cure of the suppuration is not obtained by the operation.

We could speak of a true radical operation for the worst cases of caries, cholesteatoma and malignant tumors of the temporal bone, only if the disease focus could be thoroughly eradicated, and this would be possible only if a method could be found of resecting the whole temporal bone. Whether this will happen lies in the lap of the future. But even if this were possible, there still remains in these very severe cases the not-to-be despised factor in the radical result, that the neighboring bones of the cranium may be also affected, as frequently happens in malignant tumors.

For the present, therefore, we must be conservative with the Freilegung der Mittelohrräume" (operative laying bare of the term, "radical," and I propose the expression "operative middle ear), or shorter and as comprehensive, "Totalaufmeisselung," (complete exenteration) in contrast with a partial exenteration, i. e., opening of the mastoid and laying bare of the antrum mastoideum. The term used by me for so long, complete exenteration, has been accepted by other teachers of otology. A distinct advantage of this term over "radical operation" consists, in addition to the reasons mentioned above, in the fact that it does not limit the operation to the middle ear, but permits a subsequent opening of the labyrinth, when it contains pus as shown by a fistula leading to it or by partial destruction of the labyrinthine wall of the middle ear.

II.

"BEZOLD'S ABSCESS."

In my text-book of the year 1903[1]; I stated that the form of mastoiditis which leads to a fistulous perforation of the tip or the inner wall of the process was known and described in medical literature long before Bezold, and had

even been pictured. In my "Pathologischen Anatomie des Ohres," 1878, p. 112, I reproduced the drawing of such a case, according to Kuh, which came from the year 1847. Prof. Julius Böke (Budapest) in 1873[2], before the Deutschen Naturforscherversammlung in Leipzig, demonstrated several temporal bones with such a localization of the carious perforation, where a gravity abscess towards the neck had followed. In my first discussion of 100 mastoid operations I reported in the Archiv f. Ohrenheilk. three cases of this kind, with complete histories. Nevertheless, in spite of the references to the frequent occurrence of this localization of the perforation of the bone in empyema and central caries of the mastoid, the name of Prof. Bezold has been joined to it, and it is called "Bezold's abscess." In his paper of 1881[3] he erroneously thought he had discovered a new path for the extension of the purulent inflammation from the middle ear to the vicinity. However, he referred only to a fact known for a decade before that time. Even the symptomatology of the disease, more exactly described by him, was known (hard infiltration beneath the tip of the processus mastoideus; deep, extensive gravity abscess in the lateral region of the neck, following the connective tissue sheath of the M. sternocleidomastoideus, or the sheaths of the large vessels of the neck, or towards the occiput into the neck). Until the publication of his paper (l. c.) Bezold had never seen a gravity abscess beneath the clavicle, under the sternum into the mediastinum and into the pleura, nor had he seen the so frequent caput obstipum.

Bezold, himself, has never raised any formal objection to the misuse of his name, but has patiently endured it. In his latest text-book, (1906) page 200, he gives as the ground of this designation that the existence of this symptom complex, "which in the literature is frequently called Bezold's mastoiditis," was experimentally investigated by him on the cadaver[4]. The experiment consisted in this, that Bezold, following the method of Henke, etc., injected a colored solution of gelatine, which became hard on cooling, through an artificial opening into the incisura mastoidea. The hardening fluid took a course corresponding to that of the pus in the living, between the deep muscles of the neck and throat. That his therapeutic proposition given in the article cited, viz., to make a drain through the mastoid into the incisura mastoidea, is not

to be recommended, Bezold himself will acknowledge, although he gave a case where healing followed this entirely insufficient and dangerous operation. (Facial nerve.) There is hardly an otologic surgeon today who would be satisfied with such a technic. Everybody would lay the diseased focus entirely bare, and would resect as much of the mastoid process as he found diseased, especially the entire tip, and, furthermore, would incise the abscess and follow it to its end. I consider this foundation of the term "Bezold's mastoiditis" on the experiment on the cadaver as insufficient, and I am of the opinion that it was long ago the duty of Bezold, on account of the literature to which I have referred, to disavow his paternity and to correct the error of his pupils and friends.

I gladly admit that by his work of 1881 Bezold directed general attention to a disease known and described before he did so, especially the attention of those physicians whose studies are confined to the literature of the day. But this does not prevent my entering a protest against this historically incorrect term, in spite of my recognition of the other efforts and labors of any highly honored colleague. (I refer to his careful and valuable investigations on hearing and deafmutism.)

III.

"HARTMANN'S TYMPANIC TUBE."

Formerly I incorrectly thought[5] that Toynbee was the first to use a curved tube for direct introduction from the meatus into the antrum, through a defect in the drum. But neither in his article "Preventing Caries of the Petrous Bone and the Formation of Abscess in the Brain, in Cases of Disease Within the Ear"[6], nor in his text-book, "Diseases of the Ear," did Toynbee make the statement that he used or recommended a curved canula for direct lavage of the middle ear. My mistake was caused by the fact that I was acquainted only with an abstract of the above article, which was inexact. In the original (l. c.), there appears only that in cases where the drum was absent and where there was retention of pus in the mastoid cells, Toynbee recommended the attempt to introduce a "curved probe" in the direction of the mastoid in order to make a path for the discharge of pus into the middle ear, and later to wash out the meatus carefully with warm water. In opposition to this method, Wilde[7], declares it inadvisable and dangerous. He had never done it, nor had he ever seen it employed by others.

For those who have not access to the original, I will quote the exact words of Toynbee and Wilde. Toynbee[8] writes:

"If the membrana tympani be absent, and matter is confined in mastoid cells, it is desirable by means of a curved probe to endeavor to make an exit for the matter through the natural channel into the tympanum and to use syringe with warm water carefully; by this means it is possible in some cases where the mucous membrane of the tympanum is not very thick, to secure the withdrawal of matter from the mastoid cells, etc."

Wilde[9] in an article "On Aural Diagnosis and Disease of the Mastoid Process," says:

"To obviate the consequences alluded to, Mr. Toynbee recommends, in cases of ruptured membrana tympani, 'directing the stream of water in syringing through the orifice of the membrane into the tympanum in order to evacuate the latter cavity of its contents.' This is an achievement, I am afraid, we cannot always lay claim to, as, in syringing, the stream of water fills the meatus, no matter how it is directed. The next proposal is 'by means of a curved probe (passed into the mastoid cells) to endeavor to make exit for the matter through the natural channel into the tympanum. By this means it is possible, in some cases, where the mucous membrane is not very thick, to secure the withdrawal of matter from the mastoid cells.' I have never performed such an operation, nor seen it performed by others; I can, however, suppose it possible with the patient under chloroform, although not unattended with risk, if the probe could be pushed far enough and was curved sufficiently, or if the operator could succeed in thrusting it into one or the other of the mastoid openings."

My antrum tube was first made known and pictured in the Arch. f. Ohrenheilk., Vol. XIV, Nos. 3 and 4, p. 225 (published March 18, 1878), after I had been using it for years and had demonstrated it to be useful and without danger. Dr. Arthur Hartmann (Berlin) in the Zeitschrift f. Ohrenheilkunde, Vol. VIII, p. 28, 1879, in a note to his article "Ueber Sclerose des Warzenfortsatses," stated that in syringing the middle ear and antrum mastoideum in cases of thickened masses, he used a tube of pure silver with its end bent at a right angle, whose end was inserted into the middle ear under guidance of the mirror. The other end of the tube was connected with a rubber tube by means of which the tube is joined to the syringe.

Later, Dr. Arthur Hartmann, in the Deutsch. med. Wochen., November 1, 1879, No. 44, p. 573, wrote a special article "Ueber die Ausspülung der Trommelhöhle und ihre Ausbuchtungen." (The Lavage of the Middle Ear and its Accessory Cavities.) He begins with the false statement that I had discarded my former unfavorable judgment of this method as unjustified, after he had commented on the method in his article on Sclerosis of the Mastoid. His article, as stated above, appeared in the Zeitsch. f. Ohrenheilk., Bd. VIII, 1879, while my first publication of this antrum tube appeared a year before (Archiv f. Ohrenheilk., Bd. XIV, H. 3 and 4, Sec. 225, March 18, 1878). The facts, therefore, are exactly the opposite of Dr. Arthur Hartmann's statement. One year after I had published my originally unfavorable judgment, Dr. Arthur Hartmann wrote an article for the Zeitsch. f. Ohrenheilk., and still later one for the Deutsche med. Wochenschrift, in which he described and pictured an instrument similar to mine, which he called "tympanic tube" instead of "antrum tube," and in which he described the introduction of the tube with the aid of the reflector just as I (*loc. cit.*) had described it, and had always done and taught it to be done. In order to give his "discovery" more weight, Dr. Arthur Hartmann thought it best to add, at the end of his article, "the instrument which Schwartze (loc. cit.) described soon after my first article appeared, possesses a sharp curve in that part of the tube which lies in the external canal, but the deflection in the external part of the tube is missing, so that it seems scarcely possible to introduce it under illumination with the reflecting mirror."

Every word is wrong. But the very confident statement that it seems scarcely possible to introduce my tube with aid of the reflector, after I had used and taught it for years, might easily have been spared by Dr. Arthur Hartmann. His reasons for this statement are false premises. The "sharp curve" of the tube is to adapt it to the width of the meatus, since the tube is of pure silver and can be bent, and the "lacking deflection in the external part of the tube" is superfluous, since the soft rubber tube in which the canula is introduced bends of itself.

More than twenty years ago, I mentioned this act of Dr. Arthur Hartmann in my text-book[10]. This has usually remained unnoticed, otherwise "Hartmann's middle ear tube" would not have gained and retained until now the place in otologic literature which it has not deserved.

Jacobson[11] called the instrument, which I called antrum tube, by the name of S-shaped tube, which is not aptly chosen. since my tube has by no means a S-shape. His opinion, that my antrum tube is better adapted to lavage of the middle ear through an external opening into the antrum mastoideum than to lavage of the middle ear and antrum via the meatus, is not confirmed by my experience. I have neither used nor recommended it for that purpose. To my amazement, this false statement is included in the latest Jacobson-Blau book, as well as the unsuitable name S-shaped tube.

A. Politzer (Lehrbuch, 3 Auflage, S. 360) recommended, in addition to the "Hartmann canula" an elastic canula of hard rubber slightly curved at the point and bent at an obtuse angle externally, which he had used for a long time. I have never had an opportunity to use this since. I have obtained the same result with my metal tube and rubber tube, without giving the patient any pain or discomfort. A quiet and intelligent hand, guided by the reflector, can easily introduce it through the speculum into the wide meatus, and through the defect in the drum into the attic towards the antrum.

The idea of direct irrigation of the antrum did not originate with me, or with Toynbee (v. supra), as I formerly erroneously thought, since by "curved probe" is meant a probe curved at the end and not a curved tube or canula. The first to give distinct expression to the idea of introducing a curved canula directly into the spaces behind and above the middle ear and to use it for washing out the thickened pus, etc., was v. Tröltsch[12].

Whether he tried it on the living, he does not say, nor do I know anything further either from private communications or from his pupils. For the incitation to a practical use of this idea I thank this short statement in the very valuable work of v. Tröltsch.

It is not the importance of the instrument that causes this literary historical discussion, for I am aware that this intratympanal lavage usually does not cause a cure even with the very favorable absence of caries and cholesteatoma. In a case under my observation of a patient who was afraid of operation, it was used for 23 years regularly, without any other result than that she finally asked me to perform the long deferred operation on account of an increase in the symptoms. Afterwards, she was quickly cured. My instrument, however.

often is very valuable as a diagnostic means, since the condition of the masses removed from the middle ear indicates the nature of the disease of the bone.

The chief aim of these words is to prove that Dr. Arthur Hartmann did not show anything new with his middle ear tube, and I hope to accomplish the final disappearance from our literature of the term "Hartmann's tympanic tube." My reference to this in my text book of surgical diseases of the ear (l. c.) has apparently been unnoticed by many, otherwise there would be no reason for me to return to the truth of this scientifically unimportant fact.

If there were any need of giving the canula or tube a special name, it ought to have the name of the man who first suggested its use, namely, v. Tröltsch.

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XVII.

THE SUBMUCOUS RESECTION OF THE NASAL SEPTUM. SOME REMARKS BASED ON SEVENTY-FIVE CASES.*

By Lee Maidment Hurd, M. D.

NEW YORK CITY.

In the series of submucous resection cases which forms the basis of this paper, I find that the number of males predominates over the females three to one. The average age is 27.2 years. The youngest patient was 10 years of age; five patients were under 15 years of age; the oldest patient was 64 years. The deflection occurred one-third oftener to the left than to the right. Only six gave a clear traumatic history, while in one-third of the total there was an indefinite traumatic history. In all these cases the bone as well as the cartilage was involved. Seven patients had previously been operated on with the saw or by the Asch method.

There were three perforations of the septum, equaling 4 per cent., one due to early inexperience, one to Ballenger's knife and one to a knife slipping off the anterior nasal spine while dividing a very thick periosteum. None of these perforations gave the patient the slightest trouble. Their only knowledge of their presence is from being so informed. One girl of 14 years had exophthalmic goiter which disappeared after the submucous operation. Another woman of 34 years had atrophic rhinitis with crusts on the concave side. She is now entirely well of that condition.

INDICATIONS AND CONTRAINDICATIONS.

The indications might be summed up in a few words by saying that any and all conditions of the septum requiring the removal of tissue should be done submucously. Do not misunderstand me; I do not advise a window resection for a small

*Read in the Section of Laryngology and Otology of the American Medical Association, at the Fifty-seventh Annual Session June, 1906.

spur, but I claim that it should be removed without sacrificing any mucous membrane. Deflections should be corrected submucously with but few exceptions, namely, recent traumatic cases where the component parts of the septum can be replaced.

The window resection should entirely replace the former methods of Asch, Gleason, Roe and others. In addition to the recognized pathologic conditions in which this operation is indicated and practiced, I have found where there are (1) a septum that is too thick, a condition which can probably be traced to some previous injury; (2) a thickened cartilage and much fibrous tissue between it and the anterior nasal spine, which may be abnormally high and thick; (3) the neurotic type where the thickening is high up on the septum. These all yield equally well to the submucous method.

The contraindications are few. Do not operate where there

Fig. 1.—The author's submucous elevator.

is any indication of active syphilis, acute rhinitis, hay fever, diabetes, or advanced tuberculosis. Pus in the nasal cavities due to sinusitis is not a contraindication.

METHOD OF OPERATION.

The method that I have employed is to make a curvel incision just in front of the deflection through the convex mucous membrane down to and slightly into the cartilage from the floor upward and forward as far as it can go, generally about one inch. Some operators claim that this incision does not give enough room for vision and attack of the bony deflections. I can only say that I have worked with a plain 32-candlepower electric lamp and can see perfectly and reach any portion of the septum easily with the submucous speculum in place. This incision I place just in front of the deflection. The mucoperichondrium is then elevated a short distance, or until it shows no adhesions, by using the sharp end of the elevator.

Then proceed with the reverse side or dull end of the elevator, which is made of copper, so that its shape can be adapted to any structural irregularities. It is sometimes impossible to elevate the membrane behind a very acute angular deflection until the cartilage has been removed above it. I now go through the cartilage to reach the membrane of the other side. I accomplish this by using a bone curette, thereby avoiding any injury to the opposite membrane. By this means I take out a strip of cartilage about one-eighth of an inch wide and half an inch long, which gives a sufficiently large space in which to start the elevation of the opposite mucous membrane with the sharp end of the elevator. This accomplished, I continue with the blunt end.

Fig. 2.—The author's submucous nasal speculum.

Now, having the mucoperichondrium and periosteum free on both sides over the deflection, the cartilage is removed either with my forceps or with a Ballenger knife. Introducing my speculum, which has a long upper blade and a short lower one, so that the long blade is uppermost at all times, I have a perfect view of the operative field, without lateral interference. With the same forceps used for the cartilage, the bony deflection is now broken away, first above the ethmo-vomer articulation, then below, generally bringing the thickened ridge with it.

I leave the anterior nasal spine until the last whenever it is possible to do so, as I have found that its mucoperichondrium is separated more easily from behind forward than the reverse, and because there is more tendency to hemorrhage at this point than at any other, on account of the two palatine arteries that

enter the spine from the foramina of Stenson. Sometimes there is a slight shock when this spine is broken off, on account of the severing of the nasopalatine nerves. The periosteum of the anterior nasal spine covers it entirely and the cartilage sits on it. At times it is so thick and tough that it is necessary first to incise it with a knife in order to separate it from the bone before using the elevator. If the periosteum is very adherent, I use the bone curette as an elevator; as soon as the periosteum is free the deflected bone is easily removed with the down-cut-

Fig. 3.—The author's down-cutting forceps for attacking the septal ridge.

ting forceps. This method is painless and there is no danger of injuring the mucous membrane.

I now remove the submucous speculum and coaptate the two septal membranes. If they are in the median line, with no bulging areas, the operation is complete. Should any deflection of bone or cartilage remain it must be removed, after which the sac formed by the septal membrane and the nasal chambers is irrigated with a mild antiseptic solution. The membranes are then coaptated and the two nasal cavities packed.

I have as yet found no entirely satisfactory form of packing. I formerly used Bernays' sponges, but they do not cover sufficient area and they create a pressure which can not be regulated. Lately I have been using gauze strips packed between two layers of guttapercha tissue. This with a hard rubber

splint on one side gives some opportunity for nasal breathing and is fairly satisfactory.

SPECIAL INSTRUMENTS NECESSARY.

I find four special instruments necessary, augmented by a few others that can be found in every rhinologist's armamentarium. The necessary instruments are an elevator, submucous speculum, and two pairs of forceps—one downcutting—which have been previously described.[1] Some form of knife is necessary for the initial incision. I personally like Myle's septum knife, set at right angles to the shaft, and a bone curette to go through the cartilage. These few instruments

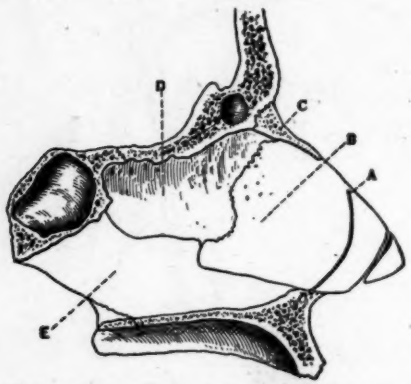

Fig. 4.—Nasal septum. A, curved incision; B, quadrilateral cartilage; C, nasal bone; D, perpendicular plate of ethmoid; E, vomer.

may be supplemented by more forceps of different sizes and a Ballenger knife. I am not as enthusiastic over the Ballenger knife as formerly, on account of two bad lacerations I have had from its use, accidents over which I seem to have had no control, but I still use it in young patients where I have reason to believe the cartilage is large. A smaller and thinner elevator can at times be used to advantage in traumatic cases.

COMPLICATIONS.

Among the complications following this operation the most annoying is the formation of hematoma. This forms between the septal membranes usually beyond the reach of the packing,

(1) Medical Record, Nov. 25, 1905.

or else after the removal of the packing. To prevent the formation of hematoma in cases liable to excessive bleeding, my custom is to place the packing in both sides of the nose, and allow that on the convex side to remain two days instead of 12 hours.

I have seen no septic infection, and there should be none if the operator is clean. I may say here that extreme attention to asepsis, such as covering a patient with sterile towels, disinfecting the nose and face, which I formerly used and recommended for a time, I now find it is not necessary, provided all instruments, the surgeon's hands and everything that goes into the nose is sterile. This method has given me good results.

IMMEDIATE RESULTS.

The nasal packing causes considerable discomfort. To some extent I have diminished this by using a hard rubber splint on the opposite side which gives the patient some breathing space. I find there is more complaint from the enforced mouth breathing than from the pressure caused by the packing. The first night there is considerable oozing of the blood-stained serum which is very annoying and often frightens nervous patients. There is a reactionary swelling soon after the packing is removed, which subsides in from two days to two weeks. For this condition I give an ointment containing 1 per cent. of menthol, which affords some relief.

ULTIMATE RESULTS.

The ultimate result achieved by this operation respecting nasal breathing particularly has been uniformly good. In some we have not only a deviated septum to deal with, but also a bulging of the turbinates which may be either bony or hyperplastic in character. This condition may be simulated by the septal deviation pressing on the turbinates or by a true bulging of the bone as well. In these cases after the septum has been placed in the median line, it will free the previously occluded side and partially close the formerly open cavity. If the bulging of the turbinates is due to a hyperplasia of the mucous membrane (which is often the case, due no doubt to a local vasomotor change caused by the deflected septum pressing against the opposite turbinate) the hyperplasia will gradually subside and in the course of a month or two the nose will have an entirely normal appearance. Should the bulging of the tur-

binate in the formerly open chamber be bony, it is best, in my judgment, first to place the septum in the median line and later to correct the shape of the turbinate by a submucous method, practically remodeling the nasal cavity.

The question now arises, Do the cartilage and bone regenerate? They do not. After a period of from one to two years I have examined most of my old cases and have found the septum flaccid to the slightest touch of the probe. From one patient, aged 14, I removed a section and submitted it to a microscopic examination and found only the two mucoperichondria with a small amount of fibrous tissue between them. As the septal ossification is not complete until the twelfth year I am keeping the few patients I have treated below that age under observation to see if there will be any regeneration. I do not

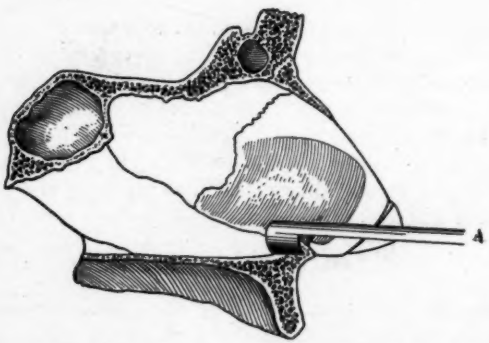

Fig. 5.—The shaded part shows the portion of the cartilage removed. A, the cutting forceps engaged on the anterior nasal spine or incisor crest and the vomer.

believe in leaving islands of bone or cartilage adherent to one membrane as nucleus for further growth of bone or cartilage, as one operator suggests, for I believe that this would rather act as a foreign body. I have had one patient complain of soreness across the dorsum of the nose and in columnar nasi on being moved from side to side even four months after operation.

The nasal profile I have never seen affected except in one

case, that of a child 10 years old who had one of the worst deflections I have ever seen. The tip of the nose was strongly bent over to one side and somewhat depressed. After several months there was a slight depression just below the nasal bone, but the physician who referred the case to me was of the opinion that there was no change in the profile.

I go as far forward in the cartilage as is necesssary to remove the deflected portion, and have not had any sinking of the nose, but I do not believe that it is a good plan to start the cartilage resection at the free border, if it can be avoided, as in the few cases in which I have done so the result is a weak-

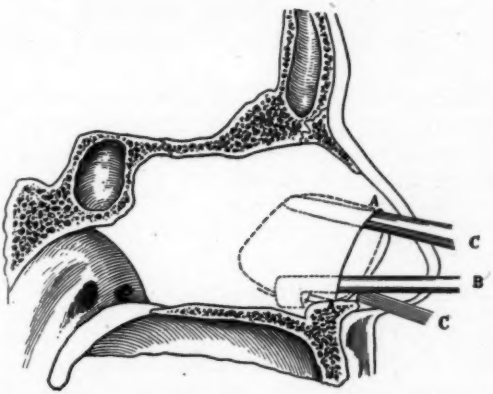

Fig. 6.—A-A shows the incision held open by the long blades of the speculum C-C; the dotted enclosure indicates the amount of cartilage removed; B, down-cutting forceps attacking the lower deflected border.

ened nose—at least the tip has not the same resiliency it had before operation, although there is no depression. I think it is better to leave a small strip of cartilage in front, running from the floor upward to the junction of the lateral cartilages. If this strip is badly deflected, replace it in the median line at time of operation or by a slight subsequent operation.

In regard to the interference with the nerves and blood supply caused by removing the anterior nasal spine or nasopalatine canal, I have attacked both whenever that portion was affected and have had no bad results of a neurasthenic nature,

therefore, I am strongly of the opinion that those who have advocated that theory find the anterior nasal spine hard to remove and use this means of excusing their faulty technic.

The mucous membrane of the septum, which before operation was congested and inflamed, generally becomes perfectly normal in color without any after-treatment.

At times the incision leaves a white linear scar, at others no scar is visible. Rarely there is a slight dryness of the membrane near the incision for several months afterward.

Perforations seem to give no trouble. The patients are only aware of their presence on being so informed, and there is no crusting about their edges. Theoretically an operator should have no perforations, but practically he will have a small number. As they cause no disturbance, I think there has been too much stress laid on the subject. Of course, it is pleasant not to have them.

The submucous window resection has now been sufficiently tested both in relation to number of cases reported and their ultimate results to place it on the firm foundation it deserves.

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XVIII.

TONSILLECTOMY BY ELECTRO-CAUTERY DISSECTION.*

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"Removal of Tonsillar Hypertrophy by Electro-Cautery Dissection" is the title under which I originally described this operation, the paper being first published in the Journal of the American Medical Association, November 22, 1890.[1], [2]. The operation was designed and first put in practice at my clinic at the Chicago Post-Graduate Medical School in January of that year and, as the results attained were highly satisfactory, I continued to employ it in both clinical and private practice though, as with every original procedure, it has with time and increased experience, passed through certain evolutionary changes, so that the technic I at present employ is somewhat different from that employed at the start.[3]

Difficulties were, from time to time, met which were successively overcome, particularly by improvement in the instruments and apparatus employed. At first, it being the age of the storage cell, I had to contend with the usual train of troubles which were common with that style of device for furnishing the electro-cautery current. Since adopting the excellent transformer of the Victor Electric Co., I have had no further trouble in securing the required volume and amperage of current so the cautery points can be heated to the desired degree and continuously maintained thereat. The transition from storage cell to transformer relegated to the past the disagreeable experience of being compelled to either postpone or discontinue a partially executed operation owing to the running down of a vascillating cell.

The operation of "cautery dissection" was designed in order that flat and degenerate tonsils could be removed in their en-

*Read at meeting of the Tri-State Medical Society at Galesburg, Ill., June 26-27, 1906.

Fig. A. Fauces in repose with left tonsil partially covered by hypertrophied anterior pillar or plica triangularis.

Fig. B. "On the gag," with arch showing "line of demarcation."

Fig. C. Showing first or primary incision beginning at point X and succeeding incisions by dotted lines.

Fig. D. Showing posterior incision.

tirety, as there can be no valid argument advanced for allowing to remain any of a tissue which is decidedly pathologic from base to surface, a tissue which can at best be regarded as only the remains of a former tonsil. Many of my operations are done to remove the diseased base remaining after a previous tonsillotomy.[4].

In early life the tonsils are detrimental chiefly on account of their size whereby they act as an obstruction to respiration. If not at this time removed by the operation of tonsillotomy, the protruding portion of the tonsil gradually diminishes in size, hence the claim of the old-time doctor that nature effects a cure through atrophy. The fact is that as the protruding portion diminishes the buried base increases in size, hence the transition is largely a process of submersion. Furthermore, this change is brought about by a low grade of inflammatory process during which the lymphoid element melts away while the follicular element relatively enlarges, hence a formation ensues of large crypts and lacunae from which caseous fetid material can be readily expressed. By the use of a bent probe it can be demonstrated that the crypts are as much as one-half inch in depth.[5]

A tonsil of this description may easily escape the eye of the inexperienced observer as it is often hidden behind the anterior pillar and may even in fact lie at the bottom of a distinct concavity between the pillars, so it can be seen only when drawn up from its bed by the use of a volsella forceps, or when the patient is caused to forcibly gag, when a bulging ragged mass is revealed (Fig. B). When this condition of the tonsils is present all of the mucous membrane back of the anterior pillars will be excessively red and more shiny than normal, constituting a chronic pharyngitis, while, on the pharynx, granular enlargements are not infrequently observed. A thickening of the lateral bands of the pharynx is also frequently present to which has been given the name pharyngitis hypertrophica lateralis. Between this area of redness and the mucous membrane, further forward, there is a distinct line of demarcation, intensified when the patient gags, and forming an arch the upper and central portion of which is lost in the uvula which serves as a keystone (Fig. B). A free amount of frothy saliva completes the picture.[4]

The tongue is usually coated, indicative of digestive disturbance, and not infrequently an offensive breath is observed.

Constipation is generally a symptom. The throat is often acknowledged to be sensitive and easily affected by exposure during inclement weather. One or more attacks of acute tonsillitis at some time in the past is often reported. If the patient is a vocalist the voice will be described as being unreliable, or instead, the report may be that of a "lost voice." A spasmodic cough will at times be mentioned and can often be excited by touching a sensitive point on the tonsil. There will also occasionally be observed a swelling and tenderness of the submaxillary or deep cervical lymphatics. While submersion of the tonsil is a condition most often seen in adults it will not infrequently be observed to a certain degree in children when it may be described as a condition of semi-submersion.

The submerged or degenerate tonsil is often present without the patient having the slightest suspicion of its presence, as there is never experienced any degree of acute inflammation. There are, however, other manifestations due to the tonsillar trouble which are rarely associated therewith by the patient.

As in several cases, a susceptibility to acute attacks of coryza has subsided after a radical removal of diseased tonsils, it became clear that the latter had a causative influence upon the former. Tubal occlusion with the secondary middle ear manifestations, and particularly tinnitus, are often benefited by the total removal of diseased tonsils. The relationship is well recognized between catarrhal conditions of either the pulmonary or gastro-intestinal tracts and the descent of mal-secretions from the nasopharynx.[6] As an active pair of degenerate tonsils can yield a much larger daily crop of pathologic material than usually falls from the nose, it is safe to give the tonsil credit for being the greater evil of the two, particularly when by microscopic and bacteriologic tests the secretion therefrom is found to be even more noxious than the other. And again, while the secretion from above is felt by the patient and is, during waking hours to a large extent expelled by expectoration, the secretion from the tonsils is chiefly squeezed out by deglutition while eating and hence is swallowed unobserved. And again, while postnasal secretions cause systemic infection mostly through their descent to either the pulmonary or gastro-intestinal tracts, a different condition exists as to the disposition of the toxic secretion generated in the diseased tonsil, for it is equally prone to being directly absorbed through either the lymphatics or the blood and is thus at times the distinct cause

Fig. E. Showing top of tonsil being pulled out as puncture is being made.

Fig. F. Showing the bottom incision.

Fig. G. Showing left tonsil out and tongue depressor with saliva ejector attached.

Fig. H. Showing both tonsils out.

of systemic trouble at distant points.[7], [8]

As tubercular germs are frequently found in the tonsils much attention has of late been given to this avenue for systemic infection. The intimate connection between the tonsils, the deep cervical lymphatics and the pleural cavity has been observed by different writers and explains the ease of pulmonary invasion as shown by Wood[9] in a recent paper based upon his personal experiments as well as upon the findings of other investigators.

Having become fully convinced of the pathologic nature of the degenerate tonsil, the question arose as to the best method for its thorough eradication. Owing to its being to a large extent submerged (Fig. A) it was necessary that the successful operation should leave a pronounced depression or concavity instead of a plane surface as after ordinary tonsillotomy. Furthermore, as the operation was chiefly to remove diseased tissue, it was more essential that the incisions should be made with deliberation and in as nearly a bloodless field as possible. The most feasible plan seemed to be a dissection with a cautery point as, when properly operated, each little vessel should be sealed as it is severed, thereby giving the bloodless field so much desired. It must be remembered though that if the point is too hot it will cut like a knife and not close the severed vessel, while, on the other hand, if not hot enough it will not advance through the tissues, nor will it properly release itself from the eschar, and will thus tear the same, so in either event hemorrhage must ensue. An electric generator is therefore required whereby the desired heat of the cautery point can be maintained, which I found to be nearly a white heat when exposed in the open air.

If the patient possesses an intolerant throat, as is generally the case with degenerate tonsils, I direct him to practice several times daily for a few days a sort of drill whereby the faucial intolerance can to a large extent be overcome. This drill is much like that of the sword swallower and consists of titillating the fauces with different substances, as the finger, a spoon, handle, the handle of a tooth brush, etc. In order to instruct the patient as to the method I give him a printed sheet of directions in which is fully described the course to follow. I never operate when there is present an acute inflammation.

A sufficient anesthesia is generally secured by swabbing the parts with a solution of cocain. I use a large cotton applicator

(Fig. 1) and have the patient make the application once a minute for about twenty minutes, one swab serving for six or eight applications, when a fresh swab is given him. For the first two swabs I use a 10 per cent solution of cocain while for the third swab a 20 per cent. solution is used. I caution him to expectorate from time to time and not to swallow the cocain. My preference is to operate after the patient has had a hearty meat meal, in this way diminishing the tendency to intoxication from the drug. I do not call to mind ever having seen a prostration from cocain when thus used in the fauces. My solutions contain one-half as much carbolic acid as there is of the cocain. In one case a complete anesthesia was secured from the use of only a 5 per cent solution, though my usual custom is to use the 20 per cent. solution as described which is effective in 90 per cent. of cases so but little or no complaint is made as to pain. Occasionally I have to use a 33 per cent. solution and have in a few cases applied powdered cocain on the moistened swab which gives 100 per cent. or full strength. In rare cases the patient is not anesthetized by local applications so I resort to other methods. In a few cases I have employed cataphoresis with success, using a special applicator (Fig. 2) for the positive current, though I more often use deep injections of a sterilized one-half of one per cent. solution of cocain without the addition of carbolic acid. For this purpose I employ my tonsil hypodermic syringe[10] and find very delicate needles the best for deep injections. I formerly injected only beneath the mucous membrane of the pillars so as to produce a bleb, but I have lately been convinced that the deep injections are more efficient when injected deep into the pillars as well as into the base of the tonsil, only a few minims at each point selected, say at a dozen or more points (Fig. 3).

By resorting to either or both of these latter two methods, in conjunction with the swab, I can secure anesthesia in all cases. During the operation if a sensitive point is reached I apply for a moment a 20 per cent. swab in the wound. In any case where excitement is present, or a prostration is feared, it can be either overcome or averted by giving a ten drop dose of a preparation made from an extract of wood-violet to which strophanthus and calabar bean are added.[11]

I am at present using a cautery handle which differs from the one I formerly employed.[12] The essential feature in this new handle is that the contact is secured by the sliding of

one tube in another whereby the possibility of corrosion is overcome and a perfect contact always secured. By a spring mechanism the current is automatically broken as soon as pressure is released from the contact lever. The electrode sockets are made extra long and are also conical, as well as the handle ends of the electrode, so perfect contact and a tight fit is secured which is entirely free from the usual and annoying wobble heretofore always present. This new handle has been made in accordance with my suggestions by the Victor Electric Co. A windlass for the hot snare, while not shown in the cut, is supplied with the handle (Fig. 4).

The electrodes I now use are of a new style made by the Converse Electric Co., and are capable of thorough asepis, being

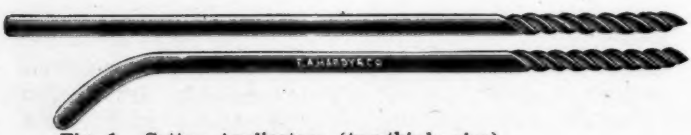

Fig. 1. Cotton Applicators (two-thirds size).

Fig. 2. Electrode for cataphoresis (two-thirds size).

made of two semicircular wires twisted about a strip of fibre (Fig. 5). For tonsil work I have them 5½ inches in length. The burning point is of iridoplatinum, No. 24 gauge. I have used a larger wire (even as coarse as a No. 20 gauge) in order to get greater rigidity when heated. By having the cautery rheostat correctly placed the No. 24 gauge gives the best results and if not pushed too fast, in other words, if allowed to burn its way through the tissue with moderate traction, it will not bend out of shape. The disadvantage of the coarser wire is that it radiates too much heat. A red hot needle can be held quite close to the cheek without inconvenience, while a red hot poker held at the same distance would burn, and yet the degree of heat would be the same in each case, though the volume of heat bears direct ratio to the bulk. Additionally, the finer the wire the more rapidly it both heats and cools, which is of great advantage in this work. By using the finer wire, the burn is

more superficial and therefore causes less soreness than did the coarser wire which I formerly employed. The points are bent in two directions, either vertical or lateral from the line of the handle, and are reversible, though in use the electrode is geneally so placed that the point inclines downward. In the illustration different degrees of bend are shown, Nos. 1 and 2, at an angle of about 45 degrees, being most often required. There are, though, conditions in which Nos. 3, 4 or 5 are more convenient to use.

The cords are extra heavy and five feet in length. With nervous patients a head rest is at times advantageous. With the new Allison rhinological chair, a good head rest is furnished and any desirable position or degree of elevation of either seat or back is easily attained. While not a necessity, a

Fig. 3. Tonsil Syringe (half size).

good fountain cuspidor is more than a convenience and gives an extra advantage owing to the saliva ejector attached.

During the operation I have the patient with his right hand manage the tongue depressor, which occupies his mind. Furthermore he is less liable to induce gagging than when the tongue depressor is held by an assistant. Latterly I have had a saliva ejector attached to the depressor (Figs. 6 and G), whereby either blood or saliva is promptly removed so the patient does not interrupt the operation to expectorate. When operating without the fountain cuspidor the same tongue depressor is employed minus the ejector.[10]

Being right handed I generally operate the patient's left tonsil first. For this tonsil an electrode is used, the point of which is so bent as to be in line with the handle (No. 2 L, Fig. 5). The tonsil is then securely grasped near its center with the

mouse-toothed No. 1 forceps (Fig. 7) and forcibly lifted from its bed. It will thus be seen to rise and move about beneath the anterior pillar and its anterior boundary will be but slightly back of the previously described line of demarcation, while the top of the tonsil will be found to be as high or higher than a horizontal line drawn from the base of the uvula. The heated cautery point is then entered to a depth of nearly one-half inch at the anterior margin of the tonsil, quite near to its superior border, and a slightly curved incision is made downward about parallel with the demarcation line, the tonsil meantime being pulled outward and backward (Fig. C). Instead of one long

Fig. 4. New Cautery Handle (three-fifths size).

Fig. 5. Tonsil Cautery Electrodes (four-fifths size).

incision a series of shorter incisions or dissections is more often made down or near to the pillar attachment to the tongue, becoming more shallow as the bottom is approached. A return is now made to the starting point and by one or more shallow incisions the upper margin of the tonsil is followed to an apex above its center by upward strokes when by downward and deeper cuts the tonsil is separated from the posterior pillar, the traction meantime being changed to outward and forward (Fig. D). The tonsil forceps is now made to grasp the upper portion of the tonsil and, with suitable traction either forward or backward as required, by continuous dissection the top of the tonsil is disengaged from the supratonsillar fossa so the remaining depression at this point will be about five-eighths of

an inch in depth. After the top of the tonsil is thus thoroughly released, with the traction continued as before, I next make a downward puncture in the middle of the wound with the heated point at the junction of the tonsil with the pharyngeal aponeurosis (Fig. E), and from this puncture dissect forward until the front margin is reached, when, by a return to the point of puncture, I dissect rearward to the posterior margin. In this way the incisions are gradually continued downward and outward at an angle so as to be near the surface when the bottom is reached. By now pulling the tonsil upward and changing the position of the electrode by entering it at the bot-

Fig. 6. Tongue depressor with saliva ejector (one-fourth size).

tom of the primary incision, point upward and handle tilted about 20 degrees above the horizontal, with one or two curved backward strokes (Fig. F) there is reached the bottom of the posterior incision and the tonsil is now attached by only a pedicle near its bottom, which can be readily severed by first placing the electrode with point turned downward and outward against its front edge as the tonsil is being pulled outward and backward, when with a firm backward and upward lift with the electrode the tonsil is swung well forward so as to stretch the pedicle over the cautery point, which is then heated and the pedicle severed. At times this same method of procedure

can be advantageously employed at other and preceding stages of the operation, and in removing remnants.

As during the entire operation firm outward traction upon the tonsil is employed, the work is in reality all done in plain sight, and not in a hole, though after the finish a deep hole remains, deepest at its upper margin and gradually scaling outward to the surface at its base, hence the submerged tonsil somewhat resembles in shape an iron wedge. The remaining wound is much larger than the tonsil removed, which is in part due to some tissue having been destroyed by the cautery but more to the elasticity of the pillars after being disengaged from the tonsil which previously bound them together. (Fig. G).

The pulling out of the tonsil as described is permitted by the stretching of the cellular tissue beneath the pharyngeal

Fig. 7. Spring tonsil forceps No. 1 (three-fifths size).

Fig. 8. Spring tonsil forceps No. 2 (three-fifths size).

aponeurosis, which latter constitutes the bottom of the resulting wound. In fact this structure, by the strong traction when the operation is half way done, may, if not too much bound down by inflammatory adhesions from preceding attacks of quinsy, bow outward to such a degree that the dissections, instead of being on the line of a concavity, are really on the line of a convexity, like the peeling of an orange, in order not to penetrate the aponeurosis. The direction of the incision being made can at any time be easily ascertained by releasing the forceps traction for a moment when the parts will resume their normal position.

In this way the entire tonsil is removed, including all of the pathologic follicular element. Formerly I divided the operation in two steps, two weeks apart, removing at first only the upper half, but latterly I remove the entire tonsil at a sitting except in

rare cases where hemorrhage is encountered. In some cases the surface of the tonsil is so rotten that the No. 1 forceps tears out. In such cases I use the No. 2 forceps with more mouse teeth and further fortified with opposing serrated surfaces (Fig. 8). These latter are often convenient for grasping sidewise, either front or rear, any small remaining remnant. These forceps are both spring forceps which automatically disengage and release their hold as soon as pressure is removed and have no spring lock, which I consider a detriment.

Occasionally, where the tonsil is bound down by previous acute inflammatory attacks, in combination with the friable or rotten surface alluded to, a forceps is required which will take a more forcible and deeper hold, when I employ my scissors vulsellum tonsil forceps (Fig. 9) with best results.[13]

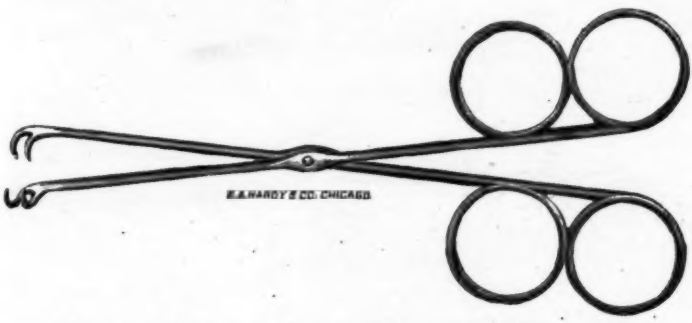

Fig. 9. Scissors vulsellum tonsil forceps (two-thirds size).

It occasionally occurs when faucial intolerance is pronounced, and when the tendency to gag is increased by the tilting over of the nearly detached tonsil so it touches the tongue, that instead of completing the operation with the cautery point I sever the pedicle with the cold snare,[14] which causes a moderate amount of hemorrhage, though easily controlled by iced gargles. I also use the snare (Fig. 10) in the same way for completing the operation if the operative field is much obscured by hemorrhage.

The operation as described usually requires from ten to twenty minutes, though in one case I removed an entire tonsil in two minutes and a half. This operation, particularly in a

sensitive throat, requires a certain degree of dexterity which can only be acquired by practice.

In this operation as described, it might seem to the spectator that the patient is being needlessly robbed of a good deal of the anterior pillar. Formerly I tried to leave all that seemed to be pillar, though it necessitated the formation of a pocket in the wound if all of the tonsil was removed, and thus gave increased discomfort and also retarded healing. Another and more important fault from trying to leave all of the pillar was the failure to remove all of the tonsillar tissue lying beneath this pillar covering and hence a continuance to a limited degree of the pathologic condition which the operation was intended

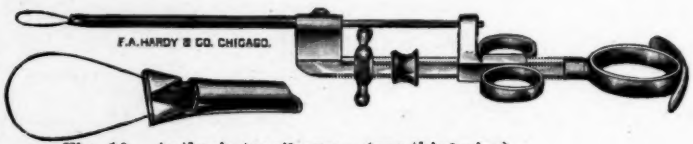

Fig. 10. Author's tonsil snare (one-third size).

Fig. 11. Tonsil presser (one-half size).

to remedy. I soon became convinced that in this condition of the tonsil, the anterior pillar was also hypertrophied and that the posterior half thereof which covers the tonsil was chiefly a mucous membrane containing little or no muscular tissue, it being often spread out so as to cover the lower half of the tonsil. (Fig. B, left tonsil.) In some cases this lower portion of the anterior pillar, when extending backward over the tonsil as described, is so thick that it may be mistaken for a portion of the tonsil itself. In no case by following my described line of incision has the patient after healing of the wound given evidence of having sustained any loss of either structure or function.

With the submerged tonsil the posterior pillar is generally quite thoroughly attached thereto and has often lost all structural resemblance to pillar tissue, seeming instead to be a part

of the tonsil. In fact the two pillars and intervening tonsil often constitute an agglutinated hypertrophied mass, so when the throat is in repose it presents simply a flat surface. In all cases I dissect out a posterior pillar, which during the process of healing assumes the appearance of a normal pillar notwithstanding its previous degenerate aspect.

In operating the second or right tonsil, generally two weeks after the first, being right-handed, I at the start use an electrode the point of which is nearly in line with the shaft (No. 3, Fig. 5), and with this make the primary incision at the posterior edge of the anterior pillar, as well as the second incision to the apex, and then a short start downward on the posterior incision, but after this I change to an electrode the

Fig. 12. Author's tonsil hemostat (one-half size).

point of which is so bent as to be at a right angle to the line of the handle, the bend being downward. (No. 1 R, Fig. 5.) Another difference which follows this change of bend is the following: When operating the left tonsil, in the making of all downward incisions the handle is swung from the horizontal downward 90 degrees to the vertical, while when operating the right tonsil the handle is held horizontal most of the time, downward incisions being made by a downward and outward pull either forward or rearward. After the change is made to the angular electrode, the operation is continued much as before described when operating the left tonsil, except when making the bottom surface incision I enter the point at the bottom of the posterior incision, the handle, meantime, being swung downward and beyond the vertical to the extent of about

20 degrees which causes the electrode point to tilt upward to the same degree, and cut forward to the bottom of the primary anterior incision; also while severing the pedicle, I enter the electrode at the rear thereof the point tilting upward as before and cut forward and outward, in this way reversing the process employed with the left tonsil. For these last two steps, if time is taken to change electrodes, a more convenient way is to use a left tonsil electrode so placed in the handle that the tip points upward.

After the tonsil is half removed, the wound being dry, I swab all the traumatic surface including that of the loosened tonsil with a 90 grain solution of argenti nitras before separating the lower half. In this way if a little hemorrhage occurs while doing the lower half the parts painted with silver are not so likely to bleed by sympathy. Before doing this I have seen bleeding extend to all parts of the wound if a little bleeder is struck at any time when near the end. In this way by the use

Fig. 13. Tip of lateral swing atomizer (full size).

of silver and careful work, I frequently remove a tonsil without the loss of a single drop of blood from the wound, and without the saliva being discolored by the few drops of blood which always exude at the points where the forceps takes hold. In case a slight hemorrhage begins at any point it can generally be stopped by a series of touches with the cautery point at a cherry red heat, and often without the knowledge of the patient, so he may not know but the operation was bloodless.

As the tonsil has such a rich supply of blood, and is in such close proximity to the larger vessels, branches of which are at times either anomalous or enlarged, any tonsil operation is likely to produce a hemorrhage. In my experience hemorrhage has been much less frequent in late years than formerly, which is in part due to improved technic, though largely due to the taking of more active and prompt steps to control it in its incipiency. A large majority of all hemorrhages occurring can be controlled by gargling with an iced alum solution or by the use of the tanno-gallic acid mixture.[3] When these fail a hypoder-

mic injection of either ergotole or morphin is generally effective, particularly in combination with the feeling of faintness which is often produced by the injection.

For the control of tonsillar hemorrhage, pressure is the most positive procedure to adopt and in case of a little spurter it can generally be arrested by digital pressure if promptly applied. pressure is required, it is wise to apply a tonsil hemostat (Fig. 11) the pad of which may if desired be moistened with a hemostatic, Monsel's solution being the best. In case prolonged pressure is required it is wise to apply a tonsil hemostat (Fig. 12). In an experience of seventeen years in tonsil work I have applied the hemostat only four times, in two cases it being done to hasten the stoppage of a hemorrhage which gave every evidence of being near its finish.[14]

Owing to paralysis of the muscular coats of the vessels from the cocain a delayed primary hemorrhage is liable to occur within twelve hours of the operation, though this rarely occurs in favorable cases if the patient follows directions by avoiding all physical exertion and prolonged efforts at conversation. I also advise against the recumbent posture during the first night's sleep and recommend passing the night in a tilted rocker or a reclining chair. The greatest danger point is 10 or 12 hours after operation when the patient drops in a dose and begins to snore. When the vessels are atheromatous, as in rheumatism or kidney disease, or after a life of intemperance, there is an increased liability to hemorrhage. Women are less liable to hemorrhage than men.

The fatalities reported after tonsillotomy have generally been due to the leaving of a fibrous base which prevented the closure of bleeding vessels. In case of a fibrous tonsil the operation of cautery dissection gives greatest promise of immunity from hemorrhage as the lines of incision are below the fibrous tissue.

Occasionally following the operation there is some febrile reaction which is relieved by one drop doses of the tincture of aconite given hourly. If the tongue becomes much coated I order one or two doses of sulphate of magnesia. Secondary hemorrhage may occur at any time during the first week from the separation of portions of the slough, though this is rare and the likelihood of its occurring diminishes day by day from the time of operation. In any event if it occurs it can be quickly controlled by iced gargles.

As an after-treatment I advise soft foods for a few days and the frequent use of a gargle of Merck's bicarbonate of soda, about a dram to a pint of water. I also advise the use every hour or two of an antiseptic gargle.

During the daily office treatments I first spray the wound with the D-P solution,[15] using low air pressure. As the spray is to be directed sidewise, and as it is desirable to hold the spray bottle upright, a device is advantageous whereby the former can be accomplished. At my suggestion the DeVilbiss Mfg. Co. modified their excellent atomizer so this can be done, and as the revolving end piece can be swung about laterally as desired it is equally suitable for either side (Fig. 13). As a local application after the spraying, I have found nothing better than "eisen-glycerin" consisting of equal parts of tincture ferri chloridi and glycerin, with which the wound is daily massaged with the long bent cotton applicator, gently at first, but with increased vigor as the soreness diminishes, in order to remove adventitious granulations and make the wound heal up smooth and solid. While most patients prefer soft foods for a week or ten days I have had a few cases wherein there was practically not the loss of a meal. After the first week the progress is very rapid and the wound is practically healed in two weeks' time. In order to guide the patient properly as to diet and other after-treatment, as well as to direct what to do in event of an emergency as a hemorrhage, I give him a printed sheet of directions in which is incorporated all needed advice. By this operation, it is rare that the patient is incapacitated for attending to his usual duties.

During the operation of tonsillectomy in case of a "small diseased" or degenerate tonsil, it is no uncommon occurrence to encounter cysts which are filled with a softened cheesy and malodorous secretion, which cysts are at times as large as a good sized green pea.[8]

As to the results derived from the operation described, the patient, in addition to a permanent immunity against future attacks of acute tonsillitis[16] will experience such improvement in the general health as might be expected from a loss of the former contaminating influence derived from diseased tonsils, hence the operation is recommended not only to relieve past or present bad effects but also as a prophylactic step whereby future troubles are averted, as for example, chronic catarrhal deafness or the chances of tubercular infection.

Following the operation, there is almost an invariable improvement in digestion and assimilation with an increased intestinal activity, whereby the former constipation is corrected, as well as the bad breath. There is often an increase in weight and clearing up of a former muddy complexion[17] which is always appreciated by lady patients. The tendency to rheumatism is also diminished, or quite likely if present an eventual cure thereof is attained.

Furthermore, a marked improvement follows as regards the former faucial redness with a fading away of the granular pharyngitis, and, if a vocalist, an improvement in the singing voice with an elevation in the high register of two or three notes.[18]

Correct patterns of the instruments I employ in this operation are kept in stock by F. A. Hardy & Co. of Chicago.

103 State street.

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XIX.

OBSERVATIONS IN ONE THOUSAND ADENOID OPERATIONS.

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PROVIDENCE, R. I.

The adenoid condition is one which is becoming increasingly familiar to the public as well as to the medical profession; so much so that there is almost a danger of "fadism" on the part of the laity, and charlatanism in some sections of the profession; and even between these extremes the operations are attempted by those who are unacquainted with the operative field and its adjoining structures, and others who have some anatomic knowledge but no technic which is very necessary for careful, safe and complete operation. Certainly, no surgeon would think of performing an operation on a part, the anatomy of which he was not familiar with, or where the results of a poor operation would be visible to the family and friends of the patient. Yet some do not hesitate to plunge into the dark depths of the throat, stir up a lot of bleeding, and mutilate the organ which, although it may not be seen by any one, is, nevertheless, a constant source of annoyance and sometimes of serious trouble to the patient.

It has been my privilege to witness this operation in several of the larger throat clinics of Germany, England, and the United States, and I have thus been allowed a choice of method, from the dry scrape with the Gottstein curette without an anesthetic, and a decidedly wet operation in the recumbent hanging head position, where it seemed as though the child would drown in its own blood.

The relation of this subject to the family doctor is one of the greatest importance. There is yet a remnant of the generation of doctors who, ignorant of the irreparable damage done to the mouth, throat, and delicate structures of the ear during

the years of the growing child, discourage operation advising that the child will outgrow the trouble. Then some of the younger generation advise operation indiscriminately; and again, we have a few odd examples like the man who says every child should be operated upon three times before it can be cured; or the man who simply lacerates the growth in very young children with his finger nail, telling the parents that another operation will be necessary in a few years for a cure of the condition. Then, too, there is the extremely careful man who removes the tonsils at one operation, and the adenoid at a subsequent operation; and the extremely thorough man who takes out everything there is, sometimes leaving the bone bare, sometimes removing the Eustachian tube cartilages. There is one case I have in mind of a colleague in a neighboring city who was consulted by a physician in behalf of his own child who had intermittent attacks of deafness. When told that his child had adenoids, he said, "Oh, if if it is adenoids I can remove them myself." And so he did, but when the deafness increased, my friend was consulted again, and on examination, under ether, found that both Eustachian cartilages had been torn out, leaving a permanent atresia of both Eustachian tubes which meant permanent deafness to the child. So I might go on, but time permits the mention of only the essentials.

One of the functions of the family doctor is to do his part in directing the care of the children of his clientel in such a way that they will grow up to be vigorous, healthy children with as good looking physical form and as well developed mental powers as nature intended for them and that they might be useful members of society and a help rather than a burden to the world; and there is no condition or diathesis or disease which can abort the good, distort the beautiful, and prostitute the useful like neglect of the adenoid condition. There is probably no condition of childhood which plays so important a part in the causation of febrile conditions, aside from the exanthemata. Many of the obscure and otherwise unexplainable attacks of febrile conditions in children up to eight years of age are due to acute inflammation of the adenoid tissue. I think it is safe to say that all earaches occurring in children under ten years of age, and the periodical earaches which occur in the night keeping the child awake for

several hours, then subsiding for several hours, and perhaps days, but repeatedly recurring, are due to temporary closure of the Eustachian tube which results from adenoid congestion following some slight exposure. The intermittent attacks of deafness which accompany a cold in the head are due to milder degrees of the same condition. Nervousness, peevishness, and all sorts of nervous phenomena and lowered vitality generally can often be traced to this diseased condition of the lymphatic glandular system of which the adenoid area is the seat of infection. So, if the family doctor would be well equipped to cope with the diseases of children, he must be well acquainted with the adenoid condition which plays so important a part in the list of predisposing causes of these diseases.

It is not my purpose in this paper to go into the symptomatology of this adenoid condition, for the books will supply this information better than I can, and you are all, doubtless, already familiar with the common symptoms. Aside from the complaints and symptoms which are so common and mark with monotony the vast majority of cases, there are occasionally subjective manifestations of peculiar interest and also prominent objective symptoms which help in making diagnosis without resorting to the shocking and disgusting method of digital examination of the nasopharynx which becomes a lasting horror to the child and causes it to dread the presence of the doctor.

I do not wish to burden this paper with statistics, so I will use as few as possible, confining myself to what seem the essential ones which have real value. These one thousand cases were about equally divided among the two sexes, there being 503 male and 497 female. The age limit ranged from six months to 37 years. The largest number at any one age was 64 at eight years of age. Dividing the age limit into periods of seven years each, about thirty per cent were during the first seven years; 50 per cent during the second seven years, and 20 per cent during the third period of seven years, there being only 28 cases over 21 years of age; 11 of these being thirty years old. In 905 cases, or about 90 per cent, the adenoids were associated with hypertrophy of the faucial tonsil, some with but a slight degree of hypertrophy, and others enormously enlarged. In these cases there was also more or less hypertrophy of the whole pharyngeal lymphoid ring. The

remaining 95 cases had the hyperplasia of the nasopharyngeal adenoids alone.

ETIOLOGY.

Investigation as to the cause of the trouble did not lead to very satisfactory results. Five cases were assigned to attacks of diphtheria, five to whooping cough, seven to measles, five to scarlet fever, one to mumps, and while the diseases of childhood undoubtedly help in the causation of this hyperplastic lymphoid condition, the data are so incomplete and negative, and so many children have enormous growths who never had any of the exanthemata that their importance in the etiology of the growth is not so great.

I have looked up the matter of climate, residence in city and country, infant feeding both by bottle or the breast, sleeping in cold or hot rooms, the relation of inherited tendencies like tuberculosis, syphilis, rheumatism and uric acid diathesis, but I do not see that any of these have a specific bearing on the subject although they may in any one or more, have their influence and doubtless do. So my only answer, imperfect as it may be, is that adenoid condition is an excessive activity of the lymphoid tissue of the pharynx, at first normal, stimulated by constant irritation from particles of dust or secretions with mild infection; the rapidity and development of the growth being governed by the atmospheric, climatic and constitutional conditions of the patient and personal hygiene.

SYMPTOMS.

1. *Subjective.*—The evidence of trouble as described by the parents of young children, or by the older ones themselves, are numerous, but the more frequent are, repeated colds in the head, difficult breathing, mouth breathing, snoring, cough, croup, hoarseness, tonsillitis, asthma, thick speech, inability to blow the nose, discharge from the nose, periodical earache, intermittent spells of deafness, intermittent or purulent discharge from the ears, nervousness, restlessness, especially at night, mental dullness, headache, epileptic seizures, night sweats, frequent feverish conditions, often quite a high fever, periods of malaise, and attacks of nausea, gagging, and vomiting, which are often attributed to digestive disturbances.

2. *Objective.*—Face—Deformed face and more or less typical adenoid expression.

Mouth—Hard palate high arched, teeth are irregular.

Nose—Improperly developed both outside and inside.

The nasal fossae showed deviated septum with ridges, erectile turgescence of the turbinals, turgescent spot on the floor of the nose; I would not say hypertrophy of the mucous membrane, for I am doubtful if organized hypertrophic tissue exists in very young children.

Ears—Dullness of the drumheads, light spot absent or only faintly visible. Chronic suppurative otitis media with more or less destruction of the drumhead. Serous otitis media and acute otitis media.

Neck—Glands larger than normal and sometimes greatly enlarged, although on the whole the lymphatics of the neck, axilla and groin were not much changed. For a time I examined these regions carefully while the patients were under ether.

Chest—Deformed chests and chicken breasts are not as frequent as might be supposed.

Throat—Thickened and sometimes nodulated faucial pillars and uvula, enlarged tonsils, enlarged follicles on the posterior and lateral walls.

Voice—Deadened. with lack of nasal resonance and frequently hoarseness.

DIAGNOSIS.

Diagnosis is easy in typical cases which show the facial expression and the effects of mouth breathing which are easily recognized by every one. About 50 per cent of the adenoid cases are mouth breathers, the remainder have little or no difficulty in breathing except perhaps when the patient has a cold; but in these cases either the ear symptoms are prominent or the effects of the growth on the general health are evident. Other important indications showing the presence of adenoid growths are the intermittent attacks of deafness and earache in children. Whenever these conditions are present we may be quite sure that adenoids are responsible for the mischief, as nothing else would cause it. The appearance of the drumhead is an important help in diagnosis, as in almost all cases where the ears have been affected at all, and even in a large number of cases where there have been no ear symptoms, the drumheads are dull and the light spot is absent or only faintly visible. The chronic suppurating ears of child-

hood, which are not dated to an attack of scarlet fever or measles, are always suggestive of adenoids, and in such cases the chance of curing the discharging ear without the removal of the adenoids is very small. Probably fifty per cent of all inflammatory diseases of the tympanum are due to adenoids.

Another helpful sign in diagnosis, where neither breathing nor ear symptoms are prominent, is a small area of swollen mucous membrane on the floor of the nose about on a line with the anterior end of the inferior turbinal. My attention was called to this about ten years ago by Dr. Lennox-Browne, of London, who said that to him it was always a positive indication of the presence of adenoids; and in my experience this has proven an unfailing sign when present.

The presence of hypertrophied faucial tonsils is always an indication of the presence of adenoids. For more than ten years I have not used my finger in determining the presence of adenoids, as it is unnecessary and it is not always reliable. The contraction of the superior constrictor muscle of the pharynx grasps the finger and it is impossible to determine whether you are feeling an adenoid mass, muscle or other soft tissue. On the other hand, the deep recess which is so often present just above the tubercle of the atlas may contain an enormous amount of adenoid tissue which the examining finger may not touch at all. It is a horror to the little patients to have the throat examined in this way, and when we can easily make a diagnosis by other means I do not think we should subject our little patients to such a barbarism.

The rhinoscopic mirror is frequently useful as an instrument in verifying a diagnosis and it can be used easily in the majority of cases.

THE PREPARATION OF THE PATIENT.

The preparation of the patient in a general way is the same as for any surgical operation. The alimentary canal should be as empty as possible and an absolutely empty stomach is best. Milk and solids should be avoided for at least six hours. If diphtheria is in the neighborhood or schools, cultures should be taken from the nose and throat to see that there is no possibility of diphtheria bacillus being present. The patient must be free from acute inflammation of the nose and throat or air passages, and purulent disease of the nasal accessory sinuses;

and if any of the family have ozena or purulent inflammation, they must be kept away from the patient after the operation until healing is complete. It is not wise to operate within a week or ten days after an attack of acute tonsillitis, or several months after syphilitic inflammation. Purulent disease of the teeth and alveoli should also be carefully considered.

These general conditions being observed, the coast is clear for operation, and the patient's head is covered with a towel or rubber cap securely fastened and all is ready for the anes-

ANESTHETIC.

All but two cases of this series were operated on under ether anesthesia. A few cases were started with nitrous oxide gas but on the whole I think clear ether is better, as the adenoid cases always require more ether than others and it is necessary to have the system saturated with it before beginning the operation. Then, too, I think nitrous oxide congests the vessels of the head and increases the bleeding. It is very necessary to have the throat perfectly relaxed, as any gagging and contraction interfere with the clear and easy removal of the growth and endanger the continuity of the soft parts of the pharynx. It is very important that relaxation is complete for the removal of the tonsils, as any interference here renders a safe and satisfactory removal of these glands impossible. Anesthesia must not, however, be carried to the profound stage, as we need the laryngeal reflex to protect the air passages against the invasion of blood clots. The absence of the eye-lash reflex is not a sufficient indication of the complete anesthesia, as the pharynx remains active some minutes after the eye-lash reflex is gone. I would discourage the use of the cornea reflex, as I have seen eyes most unmercifully poked by the anesthetist's finger.

If we could know just what condition existed before anesthesia, nitrous oxid or chlorid of ethyl or somnoform would be ideal anesthetics, but while some cases require only two or three minutes, the majority require ten minutes and sometimes longer to do a clean operation, and in one case recently it was thirty minutes before I could get the throat clean, the growth being spread about so diffusely and the patient was taking ether poorly. But I always like to find that I have plenty of time even if I do not need to use it.

Chloroform is especially dangerous in adenoid cases, as they belong to that class of cases known as the habitus lymphaticus in which chloroform is contraindicated, and in which most deaths from chloroform narcosis have occurred. Twenty deaths from chloroform in adenoid and tonsil operations have been reported since 1890, and I know of one case in Providence which could be added to the list. Knowing this, I do not think we are justified in taking the risk. In one of my cases the family physician, who was to anesthetize, was very anxious to give chloroform and when I refused to operate under such conditions, he wished to know my reasons, and after I had given them he said that he had had a large experience in the use of chloroform anesthesia and he remembered alarming symptoms in adenoid cases and what he considered narrow escapes from death, but he thought it was simply a coincidence and not that it was an adenoid idiosyncrasy.

The two cases operated on without anesthesia were, one a boy of five years who had been a "blue baby," and had a bad heart; and the other a youth of fourteen who wanted it done without ether. The former fortunately had a growth suitable for a quick operation; the latter was done at two sittings. I have seen many "adenoid scrapes" in the Vienna clinics and the various clinics in Germany, but our people would not stand for such operations, and I do not believe they are thorough. In England I have seen many operations done with nitrous oxide gas which seemed more suitable than the continental method, but they are necessarily hurried, and in some cases could not have been complete.

POSITION OF THE BODY.

My first operations were performed with the patients in an upright position held in a chair by the assistant, but the difficulty of always securing the proper assistants who could hold the patient well, and the special difficulty of handling the larger patients and the possible danger of the blood clots or particles of growth getting into the larynx, led me to try a position which I had never seen or heard of before, but which seemed to answer all the requirements of safety and convenience and in which any one could hold the patient, and after thirteen years of constant use I see no reason to change.

After anesthesia is complete the patient is turned on the right side resting on the right shoulder with both shoulders in a perpendicular line: the right hand pulled back out of the way so the patient can be easily turned forward in case of vomiting, or to allow the blood to flow out of the mouth and nose. The head is allowed to hang loosely towards the table or rest upon it. This allows the blood to flow freely, leaving the throat free from accumulation of clots, as is always the case in the position where the head is hanging over the head of the table. The table must be placed in such a position as to allow the patient to face a window with good light exposure. My own position while operating is parallel with the upper part of the patient's body as nearly as possible, which gives practically the same relationship as when the upright position is used. It is best to have a fairly high table, which can be made in any house with a kitchen or laundry table with the small section of a mattress placed upon it.

INSTRUMENTS AND TECHNIC.

Among the instruments a good mouth gag is very essential, one that is self-retaining, will not slip and does not press on the jaw in a way that interferes with the breathing. For many years I have used the O'Dwyer Gag, which, while not answering all these requirements, was the best to be had. The Jansen Gag, with some few alterations which I have made, seems to answer these demands, and is a helpful instrument. A simple palate retractor which protects the palate as well as enlarges the space for operation, so that the growth may be partly seen; forceps after the Hooper pattern, but a little larger, also Lowenberg's and other patterns to fit the peculiarities of individual cases, for no one instrument is suitable for all cases. I lately devised a forceps which suits my fancy better than any one of the others, and being made in four sizes is applicable to a greater variety of throats.

After the palate retractor is placed in position the forceps are introduced and closed on the growth, then the palate retractor is removed, and holding the grip of the forceps in the left hand, the fore-finger of the right hand is slid along the blade and the tissue which has been grasped by the forceps is separated from the pharyngeal wall by a to and fro motion of the index finger of the right hand. This avoids any unneces-

sary laceration of the mucous membranes and protects the muscle and fascia from injury, and if other parts are accidentally included it is very easy to release the forceps and make a new application of them. This process is repeated until all the redundant growth is removed. For reaching behind the Eustachian tubes in the fossa of Rosenmueller, the narrow bladed forceps are used and what is left is scraped with the finger nail of the index finger of the right hand which is kept in readiness for just such purposes. After all is removed the area is smoothed up with the finger nail and the curette is rarely used. The Gruber curette is, to my mind, the best of all. If the curette is used we must always bear in mind the possibility of wounding the tip of the tubercle of the atlas, which protrudes very prominently into the throat in a large percentage of cases. Let the curette be carelessly or forcibly drawn over this tubercle and it would be an easy matter to remove all of the soft tissue to the bone.

The tonsils are always left until the last unless they are very large and obstruct the way. These are removed by the guillotine.

For several years I used the Matthieu Tonsillotome but found it an unsatisfactory instrument for tonsils which were submerged or which did not project beyond the faucial pillars, and even in very large tonsils it is impossible to do more than cut them to a level with the pillars. For the past ten years I have used the Baginsky Tonsillotome, which is a guillotine model with a ring grip. These are made in three sizes, the openings which engage the tonsil being three-fourths, seven-eighths, and one inch in diameter. The smallest size is the most useful for the deep tonsils, and I have had a special size made one-half inch in diameter which is invaluable for removing the tissue deep in the tonsil bed and in the supra-tonsillar fossa. This instrument is simple in its construction; it may be used on either side, quickly changing from one side to the other and easily cleaned, with nothing to break or get out of order. Using the different sizes, I have been able to remove as much tissue as semed necessary in any given case. The small size is always used to clean out the supra-tonsillar fossa and other prolongations, giving a normal appearing throat in most cases after it is healed. It is often, perhaps always, necessary to make several applica-

tions of the tonsillatome in order to make a thorough removal. When the throat is thoroughly relaxed, the tonsil can be pulped, as it were, into the opening of the instrument and a piece removed at each application until one is satisfied that the fossa is clean. Here again is where many operations fail to improve or give relief to ear conditions. The supra-tonsillar fossa must be thoroughly cleared of tonsillar tissue.

I have made some use of the tonsil punch, but I can do better in most cases with a small guillotine. I have used the snare but very little; it leaves a sore throat for a longer time than the guillotine. It is too slow for me, and the question of hemorrhage, which I suppose is its chief end, is not eradicated, as cases of serious hemorrhage have been reported after its use.

Immediately after every operation, as a safeguard, I make an application of glycerite of tannin to the denuded area of the pharynx and fauces.

Other conditions operated on at the time of the adenoid operation were nasal polypi, one case; fibroma, one; deviated septum, six; ridge of septum, four; posterior turbinal hypertrophies, two; caries of the tympanum, three; carious ossicles, twenty-six; incision of drumhead for acute otitis media, five; mastoid abscess, two; phimosis, six cases.
thetic.

AFTER-TREATMENT.

After-treatment may be divided into two periods, the immediate and the future. After the patient has recovered from the anesthetic and nausea and vomiting have ceased, cracked ice and cold water are allowed. A little later cold milk and an article of food, which pleases most children, ice cream. Hot drinks and hot food are avoided, as they encourage bleeding while the cold materials tend to prevent it. After the first twenty-four hours the usual diet is allowed. The patient is kept in a moderately warm room night and day for two or three days, the temperature being kept at 65 to 70 degrees. The patient is kept in bed for twenty-four hours, and in the house at an even temperature as nearly as possible for three or four days according to the time of the year and the condition of the weather.

The patient is seen in ten days or two weeks, by which time the throat is about healed. The future treatment is sometimes

necessary, as the lowered vitality and the lymphatic habit tends to make complete results slow. Then, too, the local conditions must be looked after. It is very necessary to see that the ears resume their function naturally; that discharging ears cease, otherwise permanent deafness and serious trouble may result. The engorged condition of the turbinals must be corrected as quickly as possible in order to establish nasal breathing. This usually corrects itself in a few weeks after the operation; but the parent should be instructed that if mouth breathing continues after one or two months, the patient should be examined. This condition of persistent mouth breathing is often attributed to recurrence, but it is more often due to the engorged condition of the turbinals which is so common when adenoids are present and which often persist for a long time after they are removed.

The good results of an operation are not always immediately realized; sometimes several months are required before nasal breathing is fully stablished. It frequently happens that the parent will complain that the child is no better, or breathes with his mouth open, and is just the same as before the operation. This may happen a year or two after an operation, and they think, or they have been advised, that the growth has recurred; a few applications to the nasal mucous membranes will restore nasal breathing unless there has been some bony or cartilaginous obstruction left in the nasal fossa. It is very true that many breathe through the mouth after operation for a long time, but this is readily accounted for by habit. The muscles of the jaw which have been relaxed so long do not always readily resume a normal condition; but if the parent is persistent in correcting the child this habit will soon be overcome. In some cases, however, it may be necessary for a time at least to hold up the jaw with a piece of tape.

COMPLICATIONS.

Hemorrhage.—The adenoid and tonsil operation is necessarily a very bloody operation, but I have been especially favored in not having any serious hemorrhage in these one thousand cases. There were no cases of serious primary hemorrhage, but one case had an alarming secondary hemorrhage five days after the removal of one tonsil in an adult patient, but this was checked with ice and glycerite of tannin.

Infection.—It would seem that a large open wound would become infected while healing, but I have had but two cases which have shown any disturbing symptoms of infection. These were both in the same family, occurring a year or more apart. The mother of these children had ozena.

Earaches.—Some have reported earaches as frequently following the operation, but I have not had any which were due to the operation, although I have had three cases which had an acute inflammation of the ear three or four days after the operation which could be readily accounted for by exposure immediately after the operation.

I believe that all acute middle ears in children are due to adenoids, barring the otitis complications of the exanthemata, and I think that these are often caused by the growth. I have many times removed adenoids while the child has had acute middle ear trouble and have, I believe, prevented serious trouble with the ears. And twice in a mastoid inflammation I have removed adenoids and tonsils and I am sure that the depletion and freeing of the Eustachian tube saved the mastoid operation. It might be considered unsafe to make such a large exposed surface in the presence of the purulent disease in the ear, but I have removed adenoids in thirty-six cases of middle ear inflammation and have had no infection.

RESULTS.

The effect of the operation on the general health is, in nearly every case, very pronounced and in some cases truly marvelous. Nature seems delighted to be rid of this offending material. It seems as though a heavy weight had been removed from the child's body, as though a life that had been in bondage has been set free. The pale, sickly, poorly-nourished children begin to grow in all directions, their bodies show better nourishment, the once flabby flesh becomes firmer, the skin shows a better color, the stupid, vacant facial expression gradually disappears and a more normal physiognomy is established; and in the deformed faces of mouth breathers, if the condition has not existed too long, there is a decided change for the better as soon as the nasal breathing is established. In the children under twelve where the ears have been involved, there is usually a restoration of the hearing function. In some cases, however, after-treatment of the ears is necessary. In the suppurating ears, if there is no diseased bone, the otorrhea

ceases in a short time. The whole scene, in fact, is changed; the nervous, irritable, peevish disposition soon fades away and the child seems like a new being. The night scene is a decidedly changed one, the restless tossing about in bed, the snoring and struggling for air is replaced by peaceful, quiet sleep. All things considered, there is no medical or surgical transaction which will call forth more expression of gratitude and praise for the physician than this operation when successfully performed.

RECURRENCE.

I was called upon to operate the second time on two of my cases because other specialists had said the growth had recurred after my first operation, and the parents wanted another. In the first case, two years after the first operation, I found a piece about the size of a pea in the vault of the pharynx, otherwise the throat was smooth and clean. In the second case, which was in a doctor's family, one year after the first operation, the throat was found entirely free from growth and in a perfect condition. One case which was operated upon the first time at the age of 6 months, was again operated upon at 4 years old, and a typical growth of adenoids and tonsils was present. I have seen three cases where the tonsils, which were not completely removed, increased in size within two or three years after operation. Aside from these examples I do not know of any cases of recurrence in my cases. I have operated 15 times on cases previously done by others and in every case showed that the first operation was not well done and the growth which had been left had continued to grow so that the symptoms had only been temporarily relieved. Five cases were the result of the finger-nail operation in which the mass had been simply lacerated. In these cases the growth was as large, seemingly, as though it had never been touched and in much worse condition on account of the mesh of cicatricial bands resulting from the tearing of the growth with the finger-nail. In one case of forceps operation the fascia and muscle tissue had been torn from the posterior lateral wall of the pharynx leaving a bad deformity, but the adenoids were left in the vault of the nasopharynx and the tonsils only partly removed. One can see how in so-called scrofulous children, or in children operated before the normal development of

adenoids is complete, as under a year or so of age, it might be possible for a new growth. Yet if all redundant lymphoid tissue is carefully removed, I believe recurrence to be an extremely rare condition.

ABSTRACTS FROM CURRENT OTOLOGIC, RHINOLOGIC AND LARYNGOLOGIC LITERATURE.

I.—EAR.

The Theory of Sound-Conduction.

BOENNINGHAUS, Breslau (*Archives of Otology*, Vol. XXXV., No. 5). According to the author, the point about which the entire theory of sound-conduction rotates, is the question whether the vibrations of the basilar fibres, which according to Helmholtz's theory, are regarded as the adequate irritants of the auditory nerve terminals, are set in motion by the movements of the water column in the labyrinth in a mechanical manner—mass movement—or by means of molecular waves which traverse the labyrinth water and by addition of this molecular impulse are set in vibration just as tense strings co-vibrate—molecular movement.

His view that the basilar fibres are caused to vibrate by molecular motion rests upon the fact that the labyrinth of the whale, this water animal which constantly swims with its ear under water, hears everything well which occurs in the water about it when it is acted upon by the molecular movement. The reason for this is that the stapes of the whale is so firmly fixed in the oval window that the necessary force which would be required to make it move in the direction of the labyrinth cavity is inconceivable. The stapes is consequently physiologically immobile.

Campbell.

The Nature of Otosclerosis in the Light of Heredity.

KOERNER, Rostock (*Archives of Otology, Vol.* XXXV., No. 5). It is well recognized that progressive deafness occurs in several successive generations of a family.

Children inherit or the parents transmit only those peculiarities which are contained as rudiments in the germ plasma of the parental sexual cells. The union of the ovum and the sperm cell completes the act of inheritance. The inherent material substrata of the parental germ cells are called determinants. The unusual number of determinants do not alone

originate in the plasma of the parents, but from the collected ancestral plasma. They may be transmitted from one individual to progeny without ever having become active in that individual.

Otosclerosis is that form of progressive deafness which pathologically rests upon a hyperostotic new formation of bone in the labyrinth windows, thus fixing the stapes in the oval window and the rarefaction of the otherwise compact labyrinth capsule. Siebenmann claims that this is an abnormal hereditary post-embryonal development, in which the greatest incentive to bony growth is the onset of puberty and the childbed.

Cases in which one can not trace hereditary influence are probably those of latent inheritance. Grandchildren frequently resemble their grandparents more than they do their parents and as in twelve generations we have 4,096 forefathers it would be difficult to trace their determinants as most ancestral trees can be followed to scarcely three generations.

The only prophylaxis is to urge those who are suffering from otosclerosis not to marry, that they may carry their deteminants to the grave.

Campbell.

Disturbances of the Sense of Taste in Chronic Suppurative Middle Ear Conditions, Particularly After Operations.

LUDWIG KANDER (*Archiv für Ohrenheilkunde*, B. 68, H. 1 and 2, 1906), first discusses the chorda tympani and its importance as a nerve of taste. The first author who mentioned the chorda tympani as a possible nerve of taste was Bellingeri. He went too far, however, because he considered the chorda the only nerve of taste. Claude Bernard's investigations threw more light on the subject. In a case of paralysis of the left side of the face, due to injury to the temporal bone, he found in the anterior part of the left half of the tongue, a diminution of the sense of taste, particularly for acids. He considered the chorda a motor nerve, with the function of stimulating the taste papillæ.

Lincke reports a case in which a paralysis of the facial nerve in its course through the Fallopian canal was positively diagnosticated by the loss of taste of the corresponding side of the tongue.

The question as to where the fibres of the chorda tympani

originate has not been positively settled in spite of the many experiments. The most reasonable explanation seems to be that the chorda fibres take their origin in the trigeminus.

The author reports the following case of disturbance in the sense of taste originating intracranially, which appears to prove this theory:

A man, aged 43 years, acquired lues in 1885, which was not properly treated. Since 1887 he noticed a loss of sensation of the right half of the face. He presented himself for ear treatment in 1903. The whole right half of the face was found anesthetic, as well as the mucous membrance in the right nostril and right side of the mouth, with the exception of the base of the tongue and soft palate. The facial nerve was not involved. Hearing normal. Mastication was more difficult on the right than the left side. There was an entire absence of the sense of taste in the anterior two-thirds of the right half of the tongue. On all other parts of the tongue, soft palate, arch of the palate, and posterior wall of the pharynx, an acid was tasted at once.

So that this is a case of cerebral affection (lues), with complete right sided paralysis of the trigeminus, combined with absence of the sense of taste in the region of the end distribution of the chorda tympani.

The author made investigations of the sense of taste in 50 cases of chronic suppurative otitis media and cholesteatoma, in the Freiburg Ear Clinic. Also in cases in which operations had been performed for the middle ear condition. He wished to determine whether testing the sense of taste would indicate the relative severity of the middle ear disease.

He found in the cases in which the chorda tympani was destroyed, and in which there was an absence of the sense of taste of the anterior two-thirds of the corresponding half of the tongue, that there was a severe destructive process in the middle ear, either an extensive caries of the bone or cholesteatoma.

The experiments also proved that in every case in which the ossicles had been extracted or radical operations had been performed, the chorda tympani had been destroyed.

The plexus tympanicus which supplies the posterior third of the tongue, the soft palate, the arch of the palate, and the posterior pharyngeal wall with taste fibres, has a protected situation, and although it may be injured during curettage of

the tympanic cavity; as a matter of fact in the majority of the cases this does not occur.

A complete loss of the sense of taste in the regions supplied by the plexus, would prove that it had been completely destroyed during the operation. A chronic purulent process may in time involve the plexus.

In conclusion, the author states that a complete destruction of the chorda tympani and tympanic plexus shows itself in a complete loss of the sense of taste; that the chorda tympani may be involved in chronic suppurative middle ear processes; that the radical operation always destroys the chorda tympani, and that disturbances of the sense of taste, following this operation, are permanent and incurable.

That the chorda tympani and tympanic plexus are pure nerves of taste. *Theisen.*

On Objective Tinnitus.

FRIEDMAN (*Archives of Otology,* Vol. XXXV, No. 4). A girl aged 9 has complained of peculiar noises in both ears for several weeks. These rhythmic crepitant sounds are also heard by the observer on placing the ear near that part of the child. Their frequency is 100-120 per minute and they are not synchronous with the pulse. There are no movements to be observed in the drum. Occasionally contraction of the soft palate synchronous with the noise can be observed. The convulsions in the muscles of the lower jaw appear also to be synchronous with the noise. Hearing is normal.

The diagnosis was made of a chronic spasm of the tensor veli muscle on both sides.

It was formerly believed that all these noises depended upon a contraction of the tensor tympani muscle until Politzer in 1862 showed that this peculiar crepitation could be produced by a separation of the anterior from the posterior wall of the tube. He also observed a synchronous associated movement of the soft palate.

In most of the cases reported the patients have been nervous after a general illness or one of the ear. In the case reported the child had suffered from appendicitis and had been ill for 29 weeks. This was followed by a paralysis of the lower extremities, apparently due to a spinal meningitis, with gradual, complete recovery. *Campbell.*

The Treatment of Purulent Otitis By Congestive Hyperemia.

KEPPLER, Bonn (*Archives of Otology*, Vol. XXXV, No. 4). The author gives a detailed account of twenty cases, 10 of which were acute and 10 chronic, treated by Bier's method. As in the case of the extremities, the more acute the inflammation the more successful the treatment. Of the cases of acute mastoiditis every one was cured; in some a paracentesis was done; in some, where fluctuation was elicited over the mastoid, a miniature Wilde's incision was made.

The treatment of chronic cases of congestive treatment was less favorable. If dead bone has already been sequestrated or cholesteatoma is present, nothing can be accomplished by this method. Of seven cases only two were cured, the one being a relapsing mastoiditis subsequent to operation, the other a chronic purulent otitis with formation of a polyp in which after removal of the polpy a cure speedily took place.

Campbell.

The Advisability of Eliminating the Terms Meniere's Diseases and Meniere's Symptoms from Otologic Nomenclature.

EMIL AMBERG, Detroit, Mich. (*American Journal of the Medical Sciences*, July, 1906). Conclusions:

1. The triad: Hardness of hearing, vertigo, and tinnitus is given as constituting the functional disturbance observed in the so-called Meniere's disease.

2. These symptoms occur also in numerous affections which are not based on the pathological finding as described by Meniere in his historical case.

3. The observation that not always a typical picture is present has led to the introduction of other terms, such as "Meniere's symptoms," etc., which has proved to be confusing.

4. Even affections of the middle ear, of the outer ear, or of other parts of the body can cause the symptoms described by Meniere.

5. These latter causes can be diagnosed in many instances and prove the existence of a great group of affections characterized by functional disturbances of the inner ear.

6. By abandoning the terms "Meniere's disease" and "Meniere's symptoms" a more definite nomenclature can be introduced. This is important not only from a physiologic and pathologic, but also from a clinical standpoint. By

using, for instance, the terms "otitis interna syphilitica," or "leukemica," or "angioneurotica," or "gastrica," a clearer conception of some affections would ensue.

7. The various terms should be agreed upon. The many international medical meetings give ample opportunity for such a procedure. *Richards.*

A Contribution to the Etiology of Otitis Media Acuta Suppurativa Post Morbillos.

GUSTAV BAAR, Portland, Oregon (*Medical Record,* August 18, 1906). Five cases of otitis media suppurativa following measles, all occurring in the same family, are reported, in three of which cases the mastoid process, the antrum and the cranial cavity respectively had to be opened on account of alarming cerebral symptoms. The purulent inflammation of the middle ear occurred at about the end of the second week of the illness, which the author thinks seems to speak very much against the universal view, according to which the measle otitides are caused by the primary exanthema. Bacteriologic examination in all the cases under aseptic precautions showed that the pus taken from the depth of the external auditory meatus as well as the pus taken under aseptic precautions during the operation from the antrum, mastoid process, and extradural abscesses, contained the same coccus, a staphylococcus, which was the cause of the disease.

Richards.

A Simple Method of Finding an Easily Accessible Portion of the Lateral Sinus.

EMIL AMBERG, Detroit, Mich. (*Journal of the American Medical Association,* May 19, 1906). This will be found by bisecting the angles formed by the linea temporalis and the anterior border of the mastoid process, and projecting the bisecting line backwards. *Richards.*

Lumbar Puncture.

S. J. KOPETZKY, New York (*American Journal of the Medical Sciences,* April, 1906). This is a general review of its value and applicability with a careful resume of the published literature.

Medullary anesthesia is on the wane. Lumbar puncture as a therapeutic measure in the management of ear affections is recommended by Babinski, but it is doubtful if the test of time will prove the method to be of any great value for this class of cases.

As a diagnostic measure the advantages of conclusive results are offset by the delay in the appearance of the culture growths, as two or three weeks are necessary, and this prevents the practical application of culture methods for diagnostic purposes in the majority of intracranial complications of middle ear disease.

The reader is referred to the original article for further details. *Richards.*

The Odor as a Guide In the Treatment of Chronic Suppuration of the Middle Ear.

H. GRADLE, Chicago (*Journal of the American Medical Association*, November 24, 1906), regards the odor as a test of the efficacy of conservative treatment. Most cases of chronic suppuration are accompanied by foul odor due to the anaerobic bacillus. Decomposition of the discharge is an important factor in prolonging the disease. When freely accessible the source of suppuration is readily dislodged, which is not the case when there are sinuses or fistulas or spots protected by granulations, and it is in these later class of cases and in the presence of caries, necrosis or cholesteatoma where radical operation is more likely to be needed. He uses irrigation and gauze drainage with various local measures. such as nitrate of silver, tannin in glycerin, boric acid, alcohol and ether, followed by carbolated glycerin. When syringing and local application of these measures fail, he uses drainage by gauze tampon, but finds that this does not remove the odor directly, from three to six weeks being required until the gauze remains dry. He found gauze drainage to end in a complete cure in about 50 per cent of the cases, partial cure in 33 1-3 per cent, and failure in 16 per cent. By partial cure he means those instances in which gauze drainage removed the odor in the course of a few weeks, but failed to end the suppurative process completely. Such patients, when treatment is discontinued, do not get subjectively worse but the discharge increases slightly and may again become fetid when neglected. He has not known such cases to suffer from any consequences

or aggravations. He is, therefore, reluctant to urge a radical operation in these cases of partial success, as it is his experience that when the odor is permanently removed in chronic suppuration, the disease has lost its progressive and hence dangerous character. The patient has therefore to choose between the danger of a radical operation and the necessity of more or less prolonged treatment. *Richards.*

Teaching the Deaf Child to Hear.

HUDSON-MAKUEN (*N. Y. Medical Journal,* March 17, 1906). Writer after reporting a case and referring to the work of Natier and Urbantschitsch, concludes:

First.—The hearing of the deaf child may be greatly improved by the systematic use of oral gymnastics.

Second.—The speaking voice used in close approximation to the ear, is the most effective form of oral gymnastics in children.

Third.—The training of speech should be carried on simultaneously with the hearing exercises.

Fourth.—The degree of success attained will depend largely upon the patience and skill of the teacher. *Harris.*

The Early and Preventive Treatment of Acute Otitis Media.

WILKINSON (*N. Y. Medical Journal,* March 17, 1906). Attention is called to the fact brought out by Kerley that acute otitis media in children is often not associated with pain, but that fever is always present. In addition to the usual treatment of rest, aconite, calomel and local applications that tend to relieve pain and inflammation, Wilkinson advises when seen the employment of inflation by Politzer's method and of leeches. *Harris.*

A Case of Aneurism of the Middle Ear With Intact Drumhead.

SPENCER (*N. Y. Medical Journal,* March 17, 1906). A woman of 22 consulted him for a pulsation in the ear combined with deafness existing for three months. Examination of the ear showed a marked bulging of the membrane which seemed to merge with the lower canal wall. This was of a dark red color. There was no pain. The bone conduction was lengthened. A diagnosis of fluid in the middle ear was made. The usual

incision was followed by profuse hemorrhage, which was controlled by packing. The hemorrhage recurred upon the removal of the packing but was easily checked by the gauze, till in the course of a few days it ceased to occur and the incision closed over. The patient was under treatment for some time but made no improvement as regards the tinnitus. From the history of the case and the appearance of the drum-membrane Spencer thinks he could be dealing only with an aneurism of the middle ear. *Harris.*

Technic of the Radical Tympano-Mastoid Operation When Complicated By the Anterior Position of the Sigmoid Sinus.

BRYANT (*N. Y. Medical Journal,* April 14, 1906), in connection with the report of two cases, draws the following conclusions:

1. The extreme anterior position of the sinus is no obstacle to a complete radical operation.
2. The front bent gouge is the safest and handiest instrument for the bone carving necessary in otologic surgery.
3. Avoidance of packing in the excavated middle ear cavity results in a minimum of deformity and scar. It hastens convalescences and epidermization, by lessening the cavity, which must fill up and area must finally epidermatize.
4. My modified blood clot hastens the convalescence considerably.
5. The possibility of having an infected wound is no contraindication to this modified blood clot method.
6. Exposure of the dura mater does not contraindicate the modified blood clot method.
7. It is not necessary to suture the posterior wound in order to secure a perfect result. *Harris*

Technic in the After-Care of the Radical Mastoid Operation.

PHILIP HAMMOND, Boston, Mass. (*Journal of the American Medical Association,* November 17, 1906). This article relates almost entirely to skin grafting, which is done by the writer through the external canal seven days after the primary operation, with the graft preferably 2x3 inches, cut very thin, and applied very carefuly to the denuded bone, which by this time has a few granulations. These granulations must be carefully dried before applying the graft. A

very sharp knife is essential for the cutting of the graft. After lightly packing the graft into position, the wound is not disturbed for three days. There will be more or less purulent discharge from the sloughing of the redundant folds of the graft, but at the end of two weeks a firm layer of new skin will be visible nearly if not quite all over the cavity, and suppuration will have ceased.

One of the essentials of the technic is the introduction of the graft itself, which is placed on a cone of gauze, the apex of which will just fit into the middle ear and antrum. By this means the graft is carried clear down to the deepest portion of the antral cavity. *Richards.*

An Aseptic Protective Sheet for Mastoid Surgery.

H. O. REIK, Baltimore, Md. (*Journal of the American Medical Association,* November 17, 1906). To avoid the necessity of cutting away a great deal of hair, especially in female patients, the author has devised a heavy rubber sheet 30x30 cm., with a thin rubber insert 7x7 cm. After preparing the mastoid region in the usual way, a coating of Para rubber solution is applied to the skin and the protective sheet laid on and smoothed down in the proper position. It adheres to the skin very quickly. The thin insert is removed and a new one attached for each case, but the larger sheet can be repeatedly sterilized by boiling. The skin cut is made directly through the thin rubber section. *Richards.*

Postural Treatment of Otitis Media and Mastoditis.

A. E. SCHMITT, New York (*American Journal of the Medical Sciences,* November, 1906). The author thinks that many cases of acute purulent inflammation of the middle ear would be saved from going on to mastoiditis with the resultant operation, provided they were treated with more regard to the anatomic relationship of the middle ear and antrum. After free incision of the tympanic membrane, made so as to produce a flap by incising first from the tip of the long process of the malleus downward and then posteriorly, beginning half way up and curving down, a second incision is made meeting the first, which gives a larger opening than a single incision, permits free drainage, and is large enough for introducing a small canula for irrigating the middle ear.

The patient is then placed in a position in which the antrum is at a higher elevation than the middle ear, and the middle ear higher than the Eustachian tube. He lies face downward, the forehead and one cheek supported by pillows, the nose and mouth and one eye free. In this position perfect drainage can be secured. The patient assumes it not only from necessity but soon adopts it by preference as a comfortable posture during sleep. This permits of drainage either externally or through the Eustachian tube rather than by way of the antrum. He thinks by this method he has prevented many cases of otitis media from developing into operable mastoiditis. The region of the Eustachian tube is looked after most carefully during the treatment. *Richards.*

Paralysis of the Facial Nerve Due to the Eustachian Electro-Bougie: Report of a Case.

JOHN B. SOLLEY, New York (*American Journal of the Medical Sciences,* November, 1906). In this instance while a small bougie was being passed through the left Eustachian tube, at the second sitting for this purpose, paralysis of the facial nerve appeared almost immediately after passing an obstruction. The paralysis was complete at first, gradually became better and disappeared entirely in about one month. The author thinks it was probably due to an anatomic defect which he has found to occur in a certain number of specimens studied. As the result on the hearing was very good, he does not regard this accident as a contraindication to the use of the Eustachian electro-bougie.

So far as known, his is the only case of this accident as yet reported. *Richards.*

The Blood-Clot Method of Wound Repair in Aural Surgery.

SPRAGUE, F. B. (*The Laryngoscope,* September, 1906). The employment of the organized blood clot in the hearing of the mastoid wound is still an experimental procedure, although in general surgery it is recognized as a rational method of imitating nature and assisting her in wound repair.

There are two methods of using the blood clot: First, the closed method, using a superficial vent or not, according to circumstances; and second, the drain method, where a gauze wick drain a half inch or less in width, or a small Halsted protective drain is inserted a half inch or deeper into the cavity.

If the first method fails, the second can easily be resorted to by separating the incision with a probe and inserting a drain wick. In the most unfavorable cases where blood-clot healing is tried, healing is rarely longer han three weeks, so that if the blood-clot method should be a failure, three weeks have been gained, if measured by the duration of the old method, which required at least six weeks. One condition must be thought of in contemplating the use of the blood clot in the healing of the mastoid wound, and that is that at the bottom of the mastoid wound we have an anatomic space, the tympanum, which at the time the wound is made is pouring out infectious material which endangers the blood clot. The first point of attack should therefore be the tympanum, to rid it of as much septic material as possible. The author then describes the technic of the operation; the first step after rendering the field of operation thoroughly aseptic is to carefully cleanse the external auditory canal and tympanum.

The tympanic membrane should be freely incised from top to bottom, at the same time cutting deep enough to incise the engorged mucous membrane of the cavity. This should be irrigated and swabbed out with 60 per cent alcohol, after which the canal is plugged loosely with gauze.

In describing the technic of the mastoid operation itself, the author states that the periosteum should be elevated without injury, and replaced after the bone is evacuated. After the wound cavity is thoroughly cleaned out and irrigated with normal salt solution, it is mopped dry and allowed to fill with blood.

The periosteum is then replaced, and the soft parts brought together and sutured.

The author has operated upon 186 acute cases. In 129 of these one of the blood-clot methods was tried.

The other 57 were healed by granulation, most of these in less than four weeks. Sixty cases were treated by the drain method, healing in from 12 to 28 days. In 69 cases the typical blood-clot method was used, and 42 of them healed without interruption in from 7 to 15 days, as follows: One case in 7 days, 3 in 10 days, 2 in 11 days, 2 in 12 days, 4 in 13 days, 20 in 14 days, 10 in 15 days., Of the 69 cases, 11 had pus outside the bone, 10 had perforation of the outer cortex, 7 very extensive necrosis, and 4 had defects in the inner cortex.

The author has used the blood clot in the radical operation

in 16 cases, only two succeeding perfectly and 5 partially. Four became infected and the clot was entirely lost; 5 appeared to heal but broke down in from five to eight weeks after the operation. Nine of the cases failed. The two successful cases were healed one in five, the other in six weeks.

In conclusion, the author states that if the blood-clot method is used under favorable conditions, observing proper precautions in operating, in post-operative treatment, and in the selection of cases, we have a valuable method of wound repair.

Theisen.

Modification of the Simple Mastoid Operation Which Shortens Convalescence by Facilitating Wound Repair.

E. M. PLUMMER and H. H. GERMAIN, Boston, Mass. (*Journal American Medical Association*, November 24, 1906). The essential feature of this modification consists in removing the posterior osseous canal wall, as deeply as the facial ridge, together with a part of the roof and floor of the bony canal, pressing the soft structures carefully back into the cavity thus made, and closing the mastoid incision with sutures, a small gauze wick being allowed to remain in position until the soft parts are adherent to the bony walls. Adhesion is usually looked for at the first dressing subsequent to the operation.

Richards.

Simple and Radical Operations Under Local Anesthesia.

NEUMANN, Vienna (*Archives of Otology*, Vol. XXXV, No. 4). This method is indicated in the operation for acute mastoiditis where no subperiosteal abscess exists in all except very nervous individuals and especially in those in whom general narcosis is contraindicated.

The patient must take a hearty meal before the operation, as experience has shown that no toxic symptoms will then arise even when large doses of cocain are given. The solution recommended for injection is 5 cc. of a 1 per cent cocain solution plus 12 drops of adrenalin plus 3 cc. of normal salt solution. The injections are made in the line of incision, usually three in number (one at the upper end of the auricle, another at about the center, and the third at the mastoid tip), and two along the anterior surface of the mastoid process. These last injections are of special importance. If they are not

carried out the patient suffers excruciating pain, especially if there is caries of the posterior wall of the meatus. One must not pull too forcibly on the periosteum and not chisel away too large pieces of bone in order to avoid physical shock. Before chiselling, place a small pillow below the patient's head and have some one converse with the patient in order to divert his mind.

In the radical operation one must combine the injection method employed above with that devised for the extraction of the hammer and incus. A solution 50 per cent stronger is used. The order of injection is in such a way that the last injection is where the last operative procedure is to be made. Having anesthetized the mastoid, four syringefuls are injected into the four walls of the meatus at the place of union of the cartilage and bony parts.

The author has performed 20 radical operations under this local anesthesia and in his latter cases without causing the least pain except in curetting the opening to the Eustachian tube. The duration of the operation and the anesthesia lasted in some cases an hour and a quarter. *Campbell.*

Acute Purulent Otitis and Mastoiditis, Treated by Means of Artificially Induced Hyperemia, According to the Method of Bier, With Report of Cases.

KOPETZKY, New York (*Archives of Otology*, Vol. XXXV, No. 4). The author's observations in eight cases leads him to believe that

1. If Bier's method is used early it will greatly increase the probabilities of curing the condition without resort to major operative measures.

2. In cases cured under its influence the re-establishment of ear function will occur quicker than under the usual line of treatment.

3. Its use by the inexperienced is absolutely dangerous.

4. Its employment should be limited to the young and the otherwise healthy.

5. Finally, when the indications are kept in mind and when properly and intelligently used, when its scope and limitations are better understood, this measure is destined to find a permanent place in otologic therapeutics. *Campbell.*

Some Points in the Diagnosis of the Complications of Temporal Bone Disease Based Upon the Study of 135 Fatal Cases.

WHITEHEAD, Leeds, England (*Archives of Otology*, Vol. XXXV, No. 5). The absence of classical symptoms is a striking feature of these cases.

Headache was almost uniformly present in those cases where a brain abscess was present.

Vomiting was very frequently noted, but was absent in half of the cases of uncomplicated cerebellar abscess.

Drowsiness or coma was about equally frequent in cerebral and cerebellar abscess.

Optic neuritis was remarkably common in the cases of meningitis, being present in 8 out of 33 cases.

Nystagmus occurred in 3 cases of cerebellar abscess. The patellar reflexes were absent in 4 cases of cerebral and in 2 of cerebellar abscess.

There was an antecedent history of chronic otorrhea in 21 out of the 33 cases of meningitis; in 17 out of the 20 cases of sinus thrombosis; in 20 out of 21 cases of cerebellar abscess; in 13 out of the 15 cases of cerebral abscess, and in 1 of the 2 cases of combined cerebral and cerebellar abscess.

Examinations of the cerebro-spinal fluid through a lumbar puncture were of no diagnostic importance.

Campbell.

A Case of Hysterical Mastoid Tenderness and Pain, Without Functional Disturbance.

LANGWORTHY, Dubuque, Iowa (*Archives of Otology*, Vol. XXXV, No. 5). A poorly nourished, anemic girl aged 14 complained of severe pain over the right mastoid process for a year past.

The tympanic membranes are normal; the mastoid processes are prominent but not edematous. The right mastoid area is very tender and painful. No neck tenderness. Functional tests are normal in both ears. Under suggestive and electrical treatment the mastoid pain entirely disappeared in less than one month. *Campbell.*

Etiology and Pathology of Mastoid Empyema Complicating Acute Purulent Otitis Media.

SCHEIBE, Munich (*Archives of Otology*, Vol. XXXV, No. 5), makes a division of empyema complicating general dis-

eases and genuine empyema. The diplococcus of pneumonia is most frequently present in cases of genuine empyema, the streptococcus somewhat less frequently, while the staphylococcus is found in only a small percentage of cases.

While the kind of pyogenic germ may be a factor in the production of chronic cases, acute cases do not become chronic unless the vitality of the body is below par.

Bacteriologic research has shown that the same kind of bacteria are present in uncomplicated middle-ear suppuration as in those complicated with empyema of the bone.

Fourteen specimens were secured for microscopic study. They were all taken from cases in which perforation of the cortex had occurred and practically all showed changes well described as of a spongy transformation. In the ground substance of the bone closely crowded spaces about the size of a bone corpuscle were visible; these spaces were most abundant in the compact bone but were exceptionally formed in the trabeculæ of spongy bone. Between them normal lacunæ containing bone cells were present.

In some portions of the bone where spaces were cut obliquely, they were continuous with normal perforations of Sharpey. It was assumed that the spaces were enlarged Sharpey's canals, containing inflamed and swollen fibres of Sharpey. These changes in Sharpey's fibres were noticeable only in cases in which pus had perforated the cortex. They occurred immediately after perforation had taken place and disappeared again, or rather returned to normal after four to twelve weeks.

A noteworthy feature of the spongy transformed bone was the absence of pus between the bone and the mucous membrane. In the parenchyma of the red marrow, increase in the cellular elements and connective tissue was a constant feature. The consequent pressure caused atrophy of the fatty tissue in the marrow and finally also of the ground substance of the bone.

Campbell.

On the Operative Treatment of Purulent Meningitis.

HINSBERG, Breslau (*Archives of Otology*, Vol. XXXV, No. 5). Up to the present time there are at least ten cases recorded where meningitis has been cured after drainage of the subarachnoid space and five in which there has been decided improvement. Active treatment of purulent meningitis is not only allowed, but under certain conditions, indicated.

Of greatest importance is the broad exposure of the area where the infection of the meninges took place and where it is reasonable to suppose the principal focus is situated.

Though the chances of recovery are greatest in beginning cases, yet as Kuemmel's case of generalized meningitis, which was characterized by the severest clinical sympoms with purulent cerebro-spinal fluid, recovered, we must always after a primary lumbar puncture, drain the arachnoid space at or near the site of primary infection.

In cases of otitic meningitis where the symptoms are such that an exact diagnosis is not possible, an exploratory operation does not carry with it great danger to the patient and is just as much indicated as a puncture of the brain in suspected abscess, or the opening of the sinus in phlebitis.

Campbell.

Primary Cavernous Sinus Thrombosis Secondary to Osteomyelitis of the Petrous Pyramid.

ARNOLD KNAPP, New York (*Archives of Otology*, Vol. XXXV, No. 5). A man, aged 30, suffering from diabetes and ozena developed a left otitis media for which paracentesis was performed twice. This discharge ceased and he suffered from severe headache in the right half of the head. The right eye began to protrude and he was admitted to the hospital. The right membrana tympani was thickened and red but did not bulge. No mastoid nor frontal sinus tenderness. Two days later the left eye was protruding and there was chemosis of the conjunctivae. The right tympanic membrane was incised and the escaping pus contained diplococci in capsules.

Restlessness and sleep werefollowed by twitching of the head and limbs, coma and death.

On autopsy the dura was found unusually adherent to the skull. The blood vessels in the right Sylvian fissure were thrombosed and purulent. Over the lower anterior extremity of the right cerebellar lobe was some purulent exudate. In the right sigmoid sinus was disintegrated purulent clot. The cavernous sinuses contained thick, creamy pus.

At the apex of the petrous pyramid there was a round carious defect 1 cm. in diameter. Just underneath the Gasserian ganglion another defect was found along the superior petrous margin somewhat externally but communicating with the cavity at the apex of the petrous pyramid.

The antrum and mastoid were entirely filled with swollen granulations; this infiltration extended inward from the antrum, just above the external semicircular canal, through the cancellous tissue and communicated with the carious areas near the petrous apex described above. *Cambpell.*

The Changes in the Eye-Grounds in Otitic Disease of the Brain, the Cerebral Membranes and the Sinuses.

TAKABATAKE, Japan (*Archives of Otology,* Vol. XXXV, No. 5). 1. Changes in the optic nerves may be absent in any intracranial complication of aural and temporal bone suppurations.

2. They are more frequent in a combination of various kinds than when only one of the possible intracranial complications is present.

3. The more marked development of the eye-ground changes on one side does not prove the exclusive involvement or greater development of the original disease on the same side of the skull.

4. Changes in the optic nerves do not furnish aid in prognosis. The appearance or increase of the neuro-retinitis after evacuation of the pus from the cranial cavity does not of itself render the prognosis more unfavorable.

Campbell.

Report of Four Fatal Cases After Purulent Otitis.

HOELSCHER, Ulm (*Archives of Otology,* Vol. XXXV, No. 4). Case 1.—A man, aged 24, with an acute otitis media suppurativa had a persistent one-sided headache most marked at the supraorbital foramen. Paracentesis was followed by more profuse discharge but the bone above the auricle remained very tender.

On operation the mastoid was found sclerosed. When the bone in the region of the upper auditory canal wall was removed a large quantity of yellowish pus suddenly escaped.

His condition improved for the next week. Then very sever pain set in over the distribution of the left trigemial nerve. The brain was punctured without striking any pus. His condition grew rapidly worse and maniacal symptoms preceded death.

On autopsy there was found on the roof of the tympanum a very small fistula which communicated with the extradural abscess, drained at the time of operation, and this in turn produced the abscess found in the temporal bone. The path of infection in the production of this abscess was not found as no fistula was revealed in the dura and the dura on its inner surface appeared normal.

In the posterior cranial fossa and in the vertebral canal there was a large quantity of thin pus. The extradural abscess had extended posteriorly to the petrous pyramid, then downward between the sigmoid siuus and the internal auditory meatus where the dura became necrotic and an entrance was made under the posterior cranial fossa.

Case 2.—A man, aged 22, who had previously suffered frequently with pain in and discharge from the ear, was taken ill with la grippe. He had chills, severe headache, especially at the occiput, and the right ear began to discharge. Tenderness over the transverse sinus and jugular bulb suggested a sinus trouble, but at operation there was no reason to suspect this, as there was no nstula or carious area of bone leading to the sinus. For several days the general condition was much better, then headache returned with an evening rise of temperature. There was albuminuria, followed by occasional convulsions which involved the entire body. Stuporousness preceded coma and death. On autopsy two drams of pus were removed from the base of the brain and a large quantity escaped from the vertebral canal. There was no abscess. The dura was firmly united to the bone at the base of the skull. There were no fistulae. The sinuses were normal. The diagnosis was cerebrospinal purulent leptomeningitis with internal hydrocephalus.

Case 3.—A man, aged 21, took cold, had pains in the chest, was feverish, and complained of deafness. Nearly a month later he had an attack of tonsillitis, followed by discharge from both ears and tenderness over the left mastoid process, pain in the left side of the head, and vertigo. Mastoid tenderness and vertigo increased, he became stuporous and had convulsive seizures. The pulse was weak, 120-130.

On removing the mastoid cortex the first blow of the chisel revealed a dirty greyish membrane which proved to be the anterior wall of the sinus. The bone between the auditory canal and the sinus was not more than 2 mm. in thickness. The sinus was exposed from the upper knee downwards and found

filled with clot. The cutaneous incision was prolonged downwards along the anterior margin of the sternocleidomastoid muscle and a green cylindrical body as large as a little finger was exposed, doubly ligated and divided. The pulse was so weak that stimulation was required during the operation. Death ensued the same evening.

On autopsy the dura appeared normal. The disease of the sinus was the result of the direct contact with diseased bone. When the dura was incised yellowish pus appeared at the posterior part of the left temporal lobe. This small circumscribed meningitis joined the diseased transverse sinus. Perforation of the walls had not taken place.

Case 4.—A man, aged 21, was taken ill with influenza and the symptoms were gradually transformed to those of a septicopyemia, possibly originating from the middle ear suppuration which ensued. Temperature ranged from 37.6 to 40.5° C., and pulse 90 to 120. All the joints were tender.

The patient died and on autopsy the left sigmoid sinus contained a thrombus extending into the jugular foramen. On the side towards the petrous bone there is a collection of thick yellow pus where the dura is necrotic and roughened bone is exposed. The tympanum and mastoid process contains yellow pus. The dura in an area corresponding to the left transverse sinus lacks lustre and is greenish yellow.

Campbell.

A Case of Brain Abscess Following Traumatism and Acute Mastoiditis—Operation—Recovery.

A Case of Hysteria Simulating Brain Abscess After Operation for Secondary Mastoiditis.

WIENER, New York (*Archives of Otology*, Vol. XXXV, No. 4). Case 1.—A man, aged 43, after a traumatism suffers with hemorrhage from the right ear and amnesic aphasia in the ear opposite to the side of the lesion. Three days later the hemorrhage is replaced by a serous discharge. This ceases after a few days and the patient is on the way to recovery and the amnesic aphasia begins to disappear when there suddenly develops an attack of tonsillitis, followed by an acute otitis media purulenta and mastoiditis. On operation the roof of the antrum and tympanic cavity were found completely destroyed; on the overlying dura was granulation tissue. Sufficient, apparently,

was found to account for the symptoms present. Neither the temperature nor the other symptoms were appreciably affected by the operation, so further exploration was made and an abscess found in the posterior portion of the temporo-sphenoidal lobe. After drainage the further course was uneventful.

Case 2.—A man, aged 22, who had had a suppurating right ear since childhood, was operated upon three months before coming under observation for an acute mastoiditis. As two fistulae persisted he has had two further operations. On the fifth day after the last operation, when the cells at the zygomatic root and mastoid tip were removed, he suddenly complained of pain over the top of the head, became restless, irritable, and collapsed. Suspicion was directed to either a sudden cerebral hemorrhage or the reawakening of a latent brain abscess. The operative wound was exposed and appeared healthy. Hemorrhage was excluded by the slow pulse, regular respiration, and practically normal temperature. Against the probability of brain abscess, there was not the slightest paresis of any of the muscles supplied by the cranial nerves. There was no hemiplegia, paraplegia or monoplegia, no spasticity or rigidity in the muscles. The optis discs were normal. The patient was anesthetic on both sides of the body with the exception of the soles of the feet, tips of his toes, palms of his hands and finger tips, and within the vestibule of both nostrils. Such a distribution of anesthesia could only be a neurosis of hysterical origin.

Next day all symptoms except slow pulse had disappeared, and although he had another similar attack he made an uninterrupted recovery.

Campbell.

On the Occurrence and Absence of Crossed Paralysis and Disturbances of Speech in Otitic Suppurations of the Brain and Meninges.

TAKABATAKE, Japan (*Archives of Otology*, Vol. XXXV, No. 5). Sahli maintained that because in a very incomplete cerebral hemiplegia, the leg is less affected than the arm it would seem that the crossed paralysis occurring in these paralyses could be produced only by an injury of the internal capsule.

The inflammatory edema which in many cases surrounds the temporal lobe abscess, can easily extend to the internal capsule

while the central convulutions are protected by the Sylvian fissure against this force for some time, because the pia in this fissure does not become inflamed in the form of a leptomeningitis. In addition, all disturbances which can be produced by an injury to the internal capsule may occur in an otitic abscess of the temporal lobe.

The presence of a crossed paralysis does not prove that the abscess is large, but that either the abscess is large or there is an inflammatory disease of its surrounding tissues, an edema or more properly a toxic or bacterial encephalitis.

Large intracranial abscesses and tumors have been observed in patients where there was no crossed paralysis, no hemianopsia and no disturbance of speech.

In purulent leptomeningitis the conditions are quite different. The cerebral symptoms of irritation and paralysis, if they are not produced by direct injury of the cranial nerves at the base, are affected from the cortical centres. It is indifferent whether this is the result of the pressure exerted by an exudate or by associated involvement of the cortex.

Campbell.

A Case of Chronic Suppurative Inflammation of the Middle Ear With a Late Development of Serious Mastoid and Tympanic Symptoms.

D. B. St. John Roosa, New York. In this instance only temporary relief followed the mastoid operation. High temperature recurred and quinin, one grain hourly, was given with good result. The fever regularly abated and the ear gradually healed both in mastoid and tympanum. As there was no evidence of any kind of extension to the sinuses or to the brain, further surgical operation was not deemed advisable until after the quinin had been tried.

The author thinks the general surgeon ought to be on his guard in cases in which, after an apparently thorough operation, the cases do not do exactly as desired. He thinks there is a great temptation to pursue further operative treatment for a suspected brain abscess, and that to perform an operation to make a diagnosis is, in his judgment, an irrational, and in some cases, a dangerous procedure.

Richards.

A Case of Primary Thrombosis of the Lateral Sinus, Running Its Course With Operation, and at No Time Having Any Involvement of the Middle Ear.

FRANK M. CUNNINGHAM, New York (*American Journal of the Medical Sciences*, April, 1906). The patient had a fluctuating temperature and the chilly sensations of a septic process, but repeated examination of both ears showed no pathologic condition and no point of tenderness on careful palpation over the mastoid area.

The symptoms continuing, an operation was done. The subcortical cells showed no evidence of the presence of any active inflammation, having the appearance of diploic structure, somewhat reddened and congested. The covering from the sigmoid sinus was removed and the sinus uncovered from its knee through the descending portion, almost to its turn upwards, where it joins the inferior petrosal to form the jugular bulb. The vessel was blackened and had every appearance of an acute, diseased condition throughout the exposed area. In removing the bony covering at the knee it was seen that the vein wall had undergone a softening, degenerative process, and the tissues were easily torn when an attempt was made to uncover the vessel. Some hemorrhage resulted, but not sufficiently free, so the vein was incised along its anterior surface. The flow from above was profuse and this was blocked with iodoform gauze. The upward flow was obstructed by what was evidently a parietal thrombus, which was removed and the wound packed with gauze and allowed to heal from the bottom. Recovery was gradual, uneventful and complete.

The author does not, however, advocate the introduction of the curette, even though his case recovered, as he thinks that there is always danger of the breaking up of the clot and the dropping of particles of infected matter through the circulation of the internal jugular, with a consequent septic process in the lung and the formation of metastatic abscesses in other parts of the body. *Richards.*

Concerning the Differential Diagnosis Between Otitic and Metastatic Brain Abscess.

OBENDOERFER, E. (*Deutsche medicinische Wochenschrift*, October 4, 1906), reports the following case to show the difficulties in diagnosing and localizing brain abscesses: G. W., aged 23 years, had for seven years a purulent discharge from

the right ear. For four years he had been suffering from an almost constant cough with profuse expectoration. A week before his admittance to the hospital, he suddenly developed dyspnea, with convulsive movements of the left arm. He had a similar attack a few days later, followed by some difficulty in moving the left arm and leg. On physical examination of the chest, whistling rhonchi were heard all over. There was a profuse purulent expectoration. No tubercle bacilli were found. The heart and abdominal organs were found normal. The urine contained albumin and a few hyalin casts.

Nervous System.—Sensorium free.

A slight paresis of the left arm was found. The left leg was held stiffly when patient was placed on his back. In walking, the left leg was dragged, the left arm being held rigid, and away from the body.

Reflexes.—Patellar reflexes similar, and rather exaggerated. No Babinski. Pupils similar, and reacted to light.

Ear.—Right tympanic membrane had been destroyed. There was a profuse discharge of brownish, foul smelling pus from the right ear. No symptoms on the part of the mastoid.

The patient complained of headache, and three days after he was admitted to the hospital, he had a severe attack of vomiting. Slight convulsive movements of the left arm and leg were again noticed. The sensorium remained free even during the convulsive movements. Two days later the left-sided paresis had increased and patient was drowsy. Patient was sent to the operating room with the diagnosis of a cerebral abscess, probably of the right temporal lobe.

At the operation, the dura was found practically normal. The brain was explored eighteen times in different directions, but no pus was found. The mastoid and tympanic cavity were then opened, but nothing particularly pathologic was found. Patient died an hour after the operation. Autopsy showed both pleural cavities obliterated. Left lung was very edematous. Bronchial mucous membrane swollen, reddened, and covered with a foamy secretion. On examining the brain, the dura was found adherent to the skull at several points. The right hemisphere was larger than the left. In the middle of the right parietal lobe a large abscess cavity, filled with about 30 cm. of thick pus, was found. The entire right tympanic cavity was found filled with granulations. A brain abscess of otitic origin, located in this part of the brain, is extremely un-

usual, as they are almost always located either in the temporo-sphenoidal lobe or in the cerebellum.

Heimann has collected 819 cases from the literature (the most complete statistics to the present time) showing that this rule is nearly always true.

Koerner and others have, however, been able to collect 18 cases, in which otogenous brain abscess occurred in other parts of the brain, as for example, in the central convolutions, in the frontal lobe, fissure of Rolando, parietal lobes, optic thalamus, and the fourth ventricle. Such abscesses must at times be regarded as metastases from otogenous sinus thrombosis, decubitus, and purulent bronchitis.

The author regards his case as belonging to this class, and is of the opinion that the patient's purulent bronchitis was the source of infection. Next to the traumatic and otitic brain abscesses, those resulting from pulmonary conditions, such as gangrene and abscess, pneumonia, empyema, bronchiectasis and putrid bronchitis, are most frequent. *Theisen.*

II.—NOSE.

Anatomy of the Nose and Accessory Sinuses.

E. Oppikofer (*Archiv. für Laryngologie,* Bd. 19, Hft. 1), as a result of 200 dissections of the nose, comes to the following conclusions:

1. In the majority of cases, the floor of the antrum lies deeper than the floor of the nose.

2. Protrusion of all the teeth in the neighborhood of the antrum was observed only once. The roots were all covered by a thin layer of bone. Only in one case was there found a root without a covering layer of bone free under the mucous membrane in the cavity. This was in the case of a wisdom tooth.

3. In two cases the antrum was found markedly narrowed. In two further cases, it was divided once by a bony and once by a membranous septum.

4. The average length of the ostium maxillare is 5.4 mm., and the average breadth 2.7 mm. The smallest opening found was 2 mm. in diameter, the largest had a length of 17 mm. and a breadth of 11 mm.

5. An accessory foramen of the antrum was found about once in nine cases, more frequently unilateral than bilateral.

An accessory foramen was also found in children, not less frequently (twice in ten cases) than in the cases of adults.

6. As a rule it is not possible to probe the maxillary opening. The introduction of a probe from the middle meatus is to be preferred to introduction from the lower meatus.

7. Antra and ethmoid cells were present in all our cases. The frontal sinus on the other hand was absent in 7 instances (3 times on one side and 4 times on both sides) out of 190 cases. The sphenoid was absent in 5 cases (4 times on both and once on one side).

8. The septum was absent in the frontal sinus in 2 cases, and in the sphenoid in 14 cases, so that a single cavity was found. Furthermore in both frontal and sphenoid sinuses, the septum was now and then found partially absent, so that the two spaces communicated. This last anomaly was observed twice in the case of the frontal sinus, and 6 times in the case of the sphenoid.

9. Cystic dilatation in the middle turbinate was found in 27 out of 190 adults, but only in one case was this so marked as to produce interference with respiration.

10. Inflammations of the accessory sinuses are frequently found in the cadaver, in 94 out of 200 cases, at times catarrh, at others suppuration. Empyema were found in about every fourth case, but it is not possible to make a sharp distinction between catarrh and suppuration.

11. The inflammatory alterations in the accessory sinuses are usually of slight extent. They represent acute terminal affections, and have arisen under the influence of the prostrating general disease. They are found in the case of infectious diseases, including tuberculosis, not more frequently than in other diseases of a slower course.

12. When examination shows suppuration of a sinus, it is not usually possible to determine absolutely whether this is acute or chronic. We must seek aid of the history, and of the examination made during life.

13. Since inflammations of the sinuses found in the cadaver are usually acute, it is not right to compare, without further consideration, the results of the autopsy with clinical material, since the latter rests chiefly upon operative cases, which are usually chronic.

14. The majority of acute inflammations of the sinuses arise primarily independent of rhinitis.

15. According to our statistics, the antrum is most frequently diseased (38 per cent of the cases) then follow ethmoid in 18 per cent, the sphenoid is affected in 9.5 per cent and the frontal sinus in 7.5 per cent.

16. At times in the same individual, only one cavity is affected, while in others several on the same side may be diseased. An isolated sinusitis was found in 27.5 per cent of the cases, and a combined inflammation in 19.5 per cent.

17. Of the 94 cases of sinusitis, 60 per cent were in men and 35 per cent in women. Although in the first period of life the accessory sinuses are undeveloped, we find nevertheless sinusitis especially frequent.

18. In marked icterus the mucous membrane of the nose and sinuses is colored yellow. If serous exudate is present in the sinus, it assumes a yellow color.

19. In 16 out of 200 cases, stomach contents were found in the sinuses, most frequently in the antrum. This is due to transference after death, and it does not justify us in considering vomiting one of the etiologic factors of sinusitis.

20. In addition to the stomach contents, the cavities contained at times water and blood, which entered the cavities during the autopsy. In one case pus was found in all the sinuses, coming from pyopneumothorax.

21. Polyposis of the nasal mucous membrane is found in 6 per cent of the cases, particularly about the neighborhood of the maxillary ostium. The polypoid degeneration was slight in all cases, and only in one case was so marked as to constitute obstruction to respiration. A genuine mucous polyp was found only in one sinus, namely in the antrum.

22. Our material shows that certain of the advanced cases of genuine ozena occur with perfectly normal sinuses and without focal suppuration.

23. A larger percentage of tuberculous individuals was found among the leptoprosopes than among the chamaeprosopes.

24. Pavement and transitional epithelium occurs frequently upon the turbinates, over larger or smaller areas.

25. These two types of epithelium frequently occur on only one of the other 4 turbinates examined, and not uncommonly only over limited regions.

20. The lower and middle turbinates contain pavement epithelium with equal frequency.

27. The pavement epithelium occurs with the greatest frequency upon the side of the turbinate directed to the septum, while it is less common upon the lateral aspects.

28. Pavement epithelium is found in the anterior portions of the nose, much more frequently than in the posterior. When it is encountered in the posterior half of the turbinates, there are usually large areas of pavement epithelium present in the anterior portion. Only in two cases was pavement epithelium found exclusively in the posterior portion of the turbinates.

29. Pavement epithelium which is found in the majority of cases in the anterior portion of the turbinates, extends from here in a posterior direction in long lines. Islands of pavement epithelium are much less common.

30. Pavement epithelium varies as regards the number of cell layers, the compactness of structure and the size of the individual cells, not only in the same case, but also in the same sinus.

31. When pavement epithelium is arranged in papillae, these are most marked in the anterior regions and diminish in size and number posteriorly.

32. Among 126 sinuses which contain pavement epithelium, 40 showed here and there horny alterations, which was, however, marked in only 7 cases. This horny change is independent of the thickness of the epithelium ,and of the number and size of the papillae.

33. In the majority of cases, the basement membrane lies under the pavement epithelium.

34. Pavement epithelium is found more frequently in men (72 per cent) than in women (55 per cent).

35. In ozena, pavement epithelium is found regularly. Nevertheless the occurrence of this is not peculiar to ozena alone, since it may be found in a marked degree without fetor or crust formation in ordinary chronic rhinitis, and even in cavities which microscopically appear normal. Extensive areas of pavement epithelium simply demonstrate that marked injury has been exerted upon the mucous membrane.

36. In ozena the amount of pavement epithelium is not proportional to the degree of atrophy of the turbinates. The reverse is also true.

37. Metaplasia of the epithelium of the turbinates is independent in our cases of sinus suppuration.

38. In one interesting case squamous epithelium of the in-

terior of the nose developed from a mucous membrane with metaplasia.

39. The distribution of the glands is normally irregular in the lower turbinate. Their number diminishes from the front towards the rear, so that the anterior third is markedly richer in glands than the posterior.

40. Pigment in the connective tissue of the turbinates is found in normal and pathologic mucous membranes, and is not related to the definite local and morbid process, or to a definite general disease. It is found particularly in the anterior portions of the nose, and is markedly more common in the middle turbinate than in the lower turbinate.

41. The importance of the so-called intraepithelial glands of the mucous membrane is overestimated, since they occur regularly in normal tissues, although, to be sure, frequently only in individual instances.

42. In normal and inflamed mucous membranes, cavities occur in the epithelium of varying size and form, which have arisen through the coalescence of neighboring cells. These cavities are either empty, or contain mucus or detritus, frequently nuclei. They often show immigration of leucocytes.

43. The thickness of the cylindrical epithelium of the nose varies from 32 to 200 mikra. Exceptionally the epithelium of the nasal mucous membrane may be here and there thinner than the epithelium of the sinus.

44. Usually a basement mucous membrane is absent in the mucous membrane of the sinus, or is present only over a short distance. It may, however, be found in all the sinuses.

Goodale.

A Contribution to the Histology of the Lower Turbinate.

INOKICH KUBO (*Archiv. für Laryngologie*, Bd. 19, Hft. 1).—Histologic details which should be read in the original.

Goodale.

Suppuration in the Accessory Sinuses of the Nose.

LEWIS and A. LOGAN TURNER, Edinburgh, Scotland (*Edinburgh Medical Journal*, November, 1905).—As the result of a careful anatomic and clinical examination of a large number of healthy nostrils and of fifty-seven antral cavities which were the seat of suppuration, the authors have reached the fol-

lowing conclusions.

1. That the organisms found in the healthy nasal cavities belong to the same varieties as those occurring in abnormal conditions of the nose.

2. That the pus obtained from some cases of antral suppuration may combine organisms similar to those occurring in the buccal cavity.

3. That occasionally bacilli distinctive of dental caries may be isolated from the pus of an antral abscess.

4. That the healthy accessory sinuses are probably sterile.

5. That there are three main types of organisms commonly met with in suppuration of the accessory sinuses, namely, streptococci, pneumococci, and staphylococci.

6. That in the cases of chronic suppuration streptococci were found in 80 per cent, whilst in the more recent cases they occured in 60 per cent.

7. That the swabs taken direct from the affected cavities provide from the bacteriologic standpoint more trustworthy results than swabs taken in the same cases from the nasal cavities.

8. That in recent cases virulent organisms are met with twice as often as in cases of chronic suppuration.

9. That clinical evidence supports the view that the antrum is more frequently infected by way of the nasal cavity, and that this opinion is corroborated by bacteriological investigation.

10. That nasal polypi occur more frequently in cases of associated sinus suppuration than in simple cases of antral abscess; their association with ethmoidal cell suppuration, whether occurring alone or as a complication of other sinus inflammation, is evident from the cases quoted.

11. That the recent cases of uncomplicated antral suppuration, as contrasted with those of a chronic type, respond more readily to treament by lavage.

Richards.

Killian's Operations.

HARRIS P. MOSHER, Boston, Mass. (*Boston Medical and Surgical Journal*, October 11, 1906).—Conclusions, in view of his well-known familiarity with the anatomy and pathology of these affections, are especially interesting, and show that the surgical pendulum, so far as radical sinus operations are con-

cerned, is beginning to swing somewhat toward the normal. The final paragraph of his article is quoted entire.

"In cases of chronic frontal sinus disease there is no routine operation. With certain men the Ogston-Luc operation is practically a routine procedure; with other men, and, until lately I have belonged to this group, the granulating method has been used to the extent of routine. I have been surprised to find in some of my cases that the simpler method of opening the sinus, removing septa and the mucous membrane, and then making a large opening down into the nose, has succeeded. I feel, therefore, that in the future I shall try, in suitable cases, the simpler methods more than I have in the past. If they succeed I shall do the patient a great favor. If they do not, the more vigorous measures are still open. Do not misunderstand me, I am heartily in sympathy with the radical method of operating. In certain cases it is the only operation which will cure or approximate a cure. I say approximate a cure, because the more I see how hopelessly complicated the anatomy of some of these cases is, the more I feel that in many of them to approximate a cure is the best that can be done. To conclude, my experience for the last year convinces me that in certain cases the simpler methods of operating for frontal sinus disease are still worth a preliminary trial. Give them a trial, but do not make them an excuse for temporizing. If they fail, at once use either the granulating method or the method which goes under Killian's name." *Richards.*

The Accessory Nasal Sinuses and Pneumococcus Infections.

SAMUEL T. DARLING, Ancon, Isthmus of Panama (*Journal of the American Medical Association*, November 10, 1906).—The investigation is being conducted to determine the relation of inflammations of the accessory nasal sinuses to pneumococcus infections. In 52 autopsies there were 37 of pneumococcus infection, and 92 per cent of these showed in a very marked degree more or less typical pneumococcus inflammation of one or more of the accessory nasal sinuses. The inflammation was generally intense, fibrino-purulent in character, fibrin and mononuclear cells being abundant. Pneumococci were present in every case, and in numbers depending on the duration of the process. The age of the sinus affection was appreciably greater than that of the lung or meningeal lesion.

Ninety-one per cent of the lobar pneumonia cases showed a sinusitis.

All cases of acute pneumococcus meningitis presented an inflammation of one or more of the sinuses, and in every one the middle ears and mastoid cells were normal.

The author believes that the port of entry of the pneumococcus is in most instances an accessory nasal sinus, the mucous membrane of which is probably fitted for the reception of the pneumococcus by an antecedent influenza or rhinitis, instances of infection from a carious tooth being rare.

Richards.

The Submucous Resection of the Nasal Septum. With a Report of Fifty-Six Operations.

J. F. BYINGTON, Battle Creek, Mich. (*Journal American Medical Association,* January 12, 1907).

The Submucous Resection of the Nasal Septum. Some Remarks Based on Seventy-Five Cases.

LEE M. HURD, New York City (*Journal American Medical Association,* January 12, 1907).

Subperichondrial and Subperiosteal Operations on the Nasal Septum.

ROBERT C. MYLES, New York City (*Journal American Medical Association,* January 12, 1907).

These three articles constitute a symposium read before the American Medical Association on the submucous resection of the septum, and seem to show that up to date this operation, with its various modifications as evolved by individual operators, is producing better results than any previous septum operation. What the ultimate results with reference to regeneration of cartilage and falling in of the front of the nose are to be, only the future will tell. Up to date there seems to have been little or no trouble with after-complications of this operaton. There are a few perforations, but they seem to give no trouble, and the results as to breathing seem to be uniformly satisfactory.

In the discussion which followed it seemed to be the consensus of opinion that the operation was not adapted for children. In the few instances in which it might be done in children, care

should be taken to remove no more cartilage than would seem to be absolutely necessary, on account of the future development of the child. Dr. Roe deprecated the removal of the entire or greater portion of the separating framework of the septum, believing that fallen nose might follow.

As to the time required, one hour or more seemed to be the average; fifteen to thirty minute cases being decidedly in the minority. Some cases require two hours; whatever is necessary to do the operation carefully and without hurry. It is only necessary to remove so much of the septum as will give sufficient breathing space on each side. *Richards.*

Atrophic Rhinitis: A Reproach to Rhinology.

GEO. L. RICHARDS, Fall River, Mass. (*Journal American Medical Association*, January 5, 1907). The author thinks that atrophic rhinitis has been neglected by rhinologists; that it ought to be studied with more care and an endeavor made to get at the true theory of causation. He reviews these theories of causation but does not find any of them really satisfactory. The therapeutics up to the present time have been almost purely empirical. The results have been very disappointing.

Sarcoma of the Nasal Fossa.

RICHARD H. JOHNSON, Baltimore, Md. (*Medical Record*, December 8, 1906). The sarcoma occurred in a woman sixty-five years of age. It consisted of a grayish, white mass, having its origin apparently in the antrum, and breaking through into the nose with infiltration of its structures. The septum was not involved. The operation and removal was only partially successful. Prompt recovery occurred from the operation, but the tumor recurred as promptly. The operation seemed to stimulate the growth of the tumor, and in a few weeks a large, red, vascular mass was hanging out of the nostril. A second operation was declined and death occurred two months after the original operation.

The author thinks cases like this show how helpless we are against cases of malignant growths in the head, and that unless operation can be done very early, it will be followed by recurrence and more rapid growth of the tumor. Unless we are reasonably sure of removing the entire growth, it is better not to operate, an opinion which the reviewer, who has seen sev-

eral such cases of sarcoma of the upper jaw, would unhesitatingly corroborate. *Richards.*

The Treatment of Ozena By Paraffin Injections.

BLAH (*Archiv. für Laryngologie and Rhinologie,* Bd. XVIII, Heft. III, 1906). Since Gersuny published his work as to the correction of nasal deformities with paraffin, a considerable number of reports, recommending this remedy in ozena cases have appeared. Paraffin has been used for the treatment of such cases only for a comparatively short time, but there are nevertheless a surprisingly large number of apparent cures on record.

A cure in ozena cases can, however, be considered only in a relative sense, as the etiology of ozena has not as yet been positively worked out.

In a majority of the cases on record, good results were reported after short periods, before the patients were under sufficiently long observation.

In other cases neither the length of time of the treatment nor the period of observation after the conclusion of the treatment was stated. The author reports a series of ten ozena cases, in which this method of treatment was used, and the result of the treatment after from one to two and one-half years is given. The author has treated a much larger number of cases by this method, but only the cases that were under observation over a year are given. The patients were all young adults and children, between the twelfth and forty-fifth years. The technic employed in all the cases was as follows: Paraffin with a melting point of 45° C., after a thorough removal of the nasal crusts, was injected under the septal mucous membrane and into both atrophied inferior turbinates. About 0.5 ccm. was used at each injection. Some difficulty was experienced at first in getting the paraffin under the very thin turbinal mucous membrane. It was noticed that after each injection the nasal secretion became much thinner and more copious, the crust formation disappearing after about 24 hours. The odor from the nostril treated also became much less and in time disappeared. The nasal secretion, after the paraffin injections, was like that during the stage of resolution of an acute coryza. After several days the crusts reappeared, but in smaller quantities, and in the first patient treated, a young man aged 25 years, with a typical bilateral ozena, the crusts finally disap-

peared entirely. The patient was well two years after the discontinuance of the treatment. This same good result was obtained in all the cases. The number of the injections varied according to the severity of the individual cases. In the cases in which paraffin could not be injected under the turbinal mucous membrane, it was injected under the septal mucous membrane, in order to narrow the abnormally wide nostrils. Ordinarily ten or twelve such injections sufficed. Paraffin, with a melting point of 45° C., was employed, because it was found that when hard paraffin was used the atrophied turbinal mucous membrane was easily torn and could not be elevated.

In conclusion, the writer states that this method of treatment is safe, because no serious complications were encountered in any cases in which paraffin was used.

Theisen.

Hay Fever and Persistent Bronchial Asthma Relieved By Treatment Direct to the Antrum of Highmore.

JACOB E. SCHADLE, St. Paul, Minn. (*Medical Record,* September 8, 1906). Schadle has had extremely good results in hay fever with hypersecretion by the insufflation of the sinuses with thymol iodid. He thinks the primary inflammation is in the antrum and that the passage of this discharge into the nasal passages inaugurates the nasal and nervous phenomena, owing to their irritative properties. The central and sympathetic nervous systems become thus disturbed by the local disturbance, and neurasthenic symptoms manifest themselves.

Richards.

Syphilitic Empyema of the Accessory Sinuses of the Nose, With a Report of Four Cases.

JOSEPH H. ABRAHAM, New York (*Medical Record,* March 3, 1906). The author reports four cases of syphilis of the maxillary antrum, and gives illustrations of a set of instruments which he uses for puncturing the antrum through the nose. In all of the cases he found the empyema to quickly respond to specific treatment, and found that small doses of iodids, increasing one grain three times a day, proved of greater value in the nose than larger doses rapidly increased. Operative measures should be delayed unless there are urgent symptoms until as great absorption of the gummatous infiltra-

tion, as the result of the administration of the iodides, as is possible has taken place. *Richards.*

Head Pains and Eye Symptoms Caused By Inflammation of the Accessory Sinuses of the Nose.

C. R. HOLMES, Cincinnati, Ohio (*Ohio State Medical Journal,* February, 1906). There may be extensive purulent inflammation of one, several or even all of the sinuses on both sides without the patient ever having suffered from pain of any kind, provided there is free drainage, but the general health and the hearing are almost always affected. The most dangerous cases may have no sign of purulent secretion because of closure of the natural openings.

Increased experience in work on the sinuses confirms the author's belief that ozena as a distinct disease does not exist. He thinks that if free vent is given to all the pus-secreting cavities and they are all opened and all dead and diseased bone removed, the ozena will invariably disappear.

After excluding cerebro-spinal and tubercular meningitis and trauma, and a small proportion of cases that may have had their origin from the head and neck outside of the nasopharynx and sinuses, he thinks that practically all cases of inflammation of the brain and its membranes are caused by extension of purulent inflammation from the ear and from the nose and its accesory sinuses. *Richards.*

The Serum Treatment of Hay Fever.

CHARLES H. KNIGHT, New York (*Medical Record,* March 10, 1906). The author thinks that the etiologic importance of nasal conditions has been greatly exaggerated so far as their influence upon hay fever is concerned, and has not found that the serum treatment has as yet proved its value to any great extent. Experiments should be continued with the assurance that at least it does no harm, even though it gives results no better than those acquired by other methods.

In a personal letter to him Professor Dunbar has given three possible causes of failure.

1. "The patient does not react to pollen toxin, and is therefore indifferent to the antitoxin."

2. "Some patients are irritated by normal blood serum, and therefore also by pollantin."

3. "Many patients use too much of the pollantin." The contents of a vial should last from eight to fourteen days. The pollantin should be used in minute quantities and the treatment started before the attack begins. *Richards.*

The Use of Local Anesthesia With the Production of Anemia in the Radical Operation of Empyema of the Antrum.

NAGER (*Archiv. für Laryngologie,* Bd. 19, Heft. 1), states his procedure as follows: The patient is given a hypodermic injection of morphin 30 minutes before the operation. The interior of the nose especially laterally is thoroughly anesthetized by painting with a 10 per cent cocain and 1/10 of 1 per cent adrenalin solution. The antrum is then thoroughly washed out through the middle meatus, and receives 2 cmm. of Schleich's solution No. 2 (this contains 1/10 per cent cocain with 2 drops of 2 per cent adrenalin solution) in the region of the middle meatus. Cotton soaked with 10 per cent cocain and adrenalin is deposited. Anesthesia of the soft portions of the canine fossa is accomplished by the injection under the periosteum of the second ampulla of 1 centimeter of Bloch's adralgin. This contains 0.011 cocain with 0.1 g. 1 prom. of adrenalin solution 3 drops. For the subinucous portions he takes 4 to 5 cc. of Schleich's solution No. 2 and 3 drops adrenalin solution, and distributes this over the whole canine fossa and the neighborhood of the incision. The operation can begin in 10 minutes. The incision into the soft tissues is felt only at times, but the removal of the periosteum in the neighborhood of the infraorbital nerve is found somewhat unpleasant. The patient also feels the chiseling of the bony wall more as a shock than as a pain. The advantages claimed for this operation are the absence of hemorrhage and the shortening of the time of performance.

(It may be questioned whether these advantages outweigh the discomfort to the patient, and the risks from the employment of the amount of cocain recommended.)

Goodale.

Frontal Sinusitis as an Etiologic Factor in Acute Retrobulbar Neuritis. Report of a Case.

BLACK (*N. Y. Medical Journal,* June 2, 1902). The evidence from the report is not at all conclusive that a true inflammation of the frontal sinus was present in this case. There was,

it is shown, a hypertrophic rhinitis which was benefited by operation. Further, that the neuritis was cured. It is not, however, demonstrated that treatment to the frontal sinus produced this result.

A Case of Acute Retrobulbar Neuritis Probably Due to Sinusitis.

ZENTMAYER (*N. Y. Medical Journal,* January 27, 1906). A woman, aged 27, presented herself for pain in the head, especially in the left temple, with failing sight in the left eye. There was a clear rheumatic history. Examination of the eye diagnosed retrobulbar neuritis. A purulent inflammation of the frontal and ethmoidal sinuses was also discovered. Under the salicylates and atropin she made a satisfactory recovery. The author reasoning from the statistics that 20 per cent of cases of empyema of the accessory sinuses are complicated by inflammation of the orbital contents, concludes that the sinus disease was the cause here.

(While it is true that retrobulbar neuritis is found very often associated with sinusitis there is not sufficient evidence in this case to justify that opinion. Rather does the rheumatic origin of the disease stand out, as shown by the rapid improvement following the salicyclates.—Abstractor). *Harris.*

The Aims and Limitations of Intranasal Surgery in the Treatment of Chronic Nonsuppurative Affections of the Middle Ear.

HARRIS (*N. Y. Medical Journal,* April 14, 1906). As the result of his study of this question the author draws these conclusions:

1. The nose plays an important role as a causative factor in many cases of otitis media, but by no means in all such cases.

2. That the lesion in the nose is usually of an obstructive nature, acting as an obstacle to proper ventilation of the middle ear.

3. That in beginning cases of hypertrophic otitis media a certain amount of improvement in the hearing can confidently be expected by restoring proper ventilation of that cavity through measures addressed to the nose with the aim of relieving naso-pharyngeal and tubal inflammation; but that (a) only such cases of this disease call for nasal treatment as show pathologic changes in the throat, which demand attention of

themselves apart from the condition of ear; (b) that it is important to determine the true nature of the process in the middle ear, as the sclerotic or so-called hyperplastic form is not influenced at all by such treatment, and (c) that adhesive changes and ankyloses cannot be expected to yield, however completely the nasal obstruction is removed.

4. That an important result to be secured by treatment is the relief afforded from the repeated attacks of acute rhinitis which by their effects on the Eustachian tube are wont to aggravate the chronic condition.

5. That tinnitus aurium and vertigo are at times benefited by nasal treatment.

6. And finally that because of the importance of treatment to the nose and throat a closer association clinically of otology and rhinology is urgently demanded. *Harris.*

III.—MOUTH AND PHARYNX.

Certain Facts Concerning Faucial Tonsils.

CHARLES M. ROBERTSON, Chicago (*Journal American Medical Association,* November 24, 1906). This is a study in the anatomy and the relation of the tonsil to the superficial and deep lymphatics. It has been shown that there is an intimate relation between the cervical and bronchial chains, especially the peritracheobronchial, the intertracheobronchial, the interbronchial and the posterior intercostal chains. These gland chains communicate with the thoracic duct direct, but they also communicate with the cervical and subclavian glands by their anastomotic branches. Hence, an infection from the tonsil may be transferred to the upper lobe of the lung direct.

The author has been studying by means of microscopic slides the character of the tonsils which he has removed, having studied 232 such cases, without regard to symptoms complained of by the patient. The greater part of the tonsils were of the submerged type. He found 8 per cent of all the cases presented undoubted tubercular lesions in the form of giant cells and tuberculous tissue change. He thinks that large numbers of the apex tuberculosis cases may come from direct infection of the tonsil. He has found cases in which there was a tuberculous infection of one tonsil and not of the other, and has found a dull spot on the apex of the lung in the same side of the body as the infected tonsil. He has found the cervical

lymphatics which have been infected to gradually disappear after removal of the tonsil, the tonsil having been found to be tuberculous. The glands are able to destroy germs by their phagocytic property, but there comes a time when they are unable to compete with the great amount of labor heaped upon them.

He regards it as very essential that the tonsil when diseased should be removed, that when operated on for removal, it should be removed completely, and that pockets in the soft tissues around the tonsils must be destroyed. To do this there must be some mode of operative procedure more thorough than operations by the tonsillotome. The technic of enucleation with the scissors is then given. *Richards.*

Sudden Paralysis of the Pharynx—Artificial Feeding for Four Years.

S. WEIR MITCHEL (*Journal of the American Medical Association,* December 15, 1906) reports the following extraordinary case.

Mrs. E. S., aged 27 years, married, of good health and good personal and family history. About 18 months after her marriage on May 18, 1901, she was confined. Between this time and July 21, her health was perfect.

She went to bed on the night of July 21, without sign of trouble and awakened in the night with a chill and sore throat. By seven in the morning she could not swallow. From that day she has never swallowed a particle of food, being fed entirely by tube. On July 23, there was high temperature, reaching 104 to 106 in the evening, with much pain and great swelling of the neck, and considerable inflammation of the pharynx, arch of the palate and tonsils.

All effort at deglutition gave great pain, and the food choked her and was driven up into the posterior nares. She was seen at this time by a competent physician, who said there was no visible sign of diphtheria and no abscess of the tonsils. Within the next 48 hours, the left leg and arm became more cold to the touch than the limbs on the other side. There was marked ptosis of the left eyelid, and the face was slightly drawn to the right. Within the first 36 hours of the attack, she coughed up pus and blood in what she described as large quantities. This lasted three days, and then rather suddenly disappeared. A painful swelling of the left wrist occurred about

this time and there was much pain in the muscles generally. On August 5, 1901, she was taken to Johns Hopkins Hospital, the temperature being still as high as 102. A somewhat doubtful diagnosis of diphtheria was made there.

She was seen by Dr. Mackenzie, who, apart from the paralysis, found nothing abnormal in the larynx, pharynx, nasal passages and accessory sinuses. Deglutition was impossible and she had to be fed through a tube which could be passed to the stomach without difficulty. There was no suspicion of a swelling or growth in the esophagus.

Dr. Mackenzie removed some hypertrophied lymphoid tissue from the vault of the naso-pharynx, but this had no effect on the paralysis.

The idea of hysterical palsy had been considered and abandoned after electricity, hypnotism, and various drugs had failed to improve the patient's condition.

During the first year after treatment was given up, she lost 36 pounds in weight. Her teeth, previously sound, crumbled away like chalk.

In May, 1905, four years from the onset of the attack, the patient was examined by Dr. Mitchell. She feeds herself through a tube which is carried a little past the level of the larynx, and when food is poured through the tube it reaches the stomach without difficulty. She is quiet and unemotional. Dynamometer registers right 47, left 45.

Reflexes: Right knee jerk zero, and cannot be reinforced by motion or sensation; left knee jerk capricious, at times active and is reinforcible. Ankle jerks right and left, absent, as well as the plantar reflexes.

There is no Babinski reflex. The early acquired left ptosis is better, but is not absent and is worse whenever she is fatigued. The upper part of the face acts less quickly than the right.

On the outer aspect of the right leg there was total anesthesia, just above the knee, in a space some three inches in extent. The left leg was apparently normal. There is no disturbance of sensibility of the right arm.

Heat and cold are felt tardily on the entire right side of the body, and sensibility to cold is lessened.

Examination of the throat by Dr. Seiss, resulted as follows: The mucous membrane of the pharyngeal region was anemic; no gross lesions. The larynx could be examined with great

ease, and an excellent view of the bronchial openings could also be obtained.

The larnyx showed little except atrophy and anemia, and a remarkably normal membrane for a tube fed patient, in whom there is more or less traumatic laryngitis.

The entire pharyngeal region was more or less anesthetic. There was, however, no motor paralysis of the palate. There appeared to be both motor and sensory paralysis of the pharyngeal constrictor. The whole larynx seemed without sensation. There was no motor paralysis of the larnyx, the cords approximating perfectly.

Dr. Seiss came to the conclusion that it was an extreme case of diphtheritic paralysis. The throat was so insensitive in this case that it was easy to examine the usually sensitive pharyngeal surface with the finger.

Not even saliva could be swallowed. It collected in the mouth, and was then allowed to drain out on a handkerchief. In the latest examination of the throat it was found that at the limit of the observer's powers to explore the pharynx, there was a firm growth in the middle line, projecting forward from the anterior face of the pharynx. It was very difficult to reach, and might easily have escaped observation. In fact, it must have done so. The tumor was about an inch wide at the level of the arytenoid cartilages. Its extent below was undetermined until an X-Ray picture not only revealed how dense this structure was, but also the extent to which it extended down the canal behind the pharyngeal mucous membrane. It was possible to carry a finger behind the larynx, so as to feel that there was scarcely any room between it and this smooth, hard, rounded mass, which projected from the anterior surface of the pharynx. The mass was slightly tender on pressure, and too hard to penetrate with an exploring needle.

The reflexes were now generally better. The knee jerk is present on the left side, but is feeble. On the right side the knee reflex is obtainable only at every fourth or fifth blow of the hammer. The ankle jerk is not present on either side. There is still no plantar nor Babinski reflex. Dr. Mitchell believes, that early in this case there was an abscess between the vertebrae and the anterior wall of the pharynx. The date of the origin of the tumor is doubtful. It was too dense to have been of rapid growth. It could hardly have escaped Dr. Mackenzie's notice, and was probably of a gradual and later forma-

tion. The growth cannot be used to explain the paralysis. There was probably some toxic cause for the local palsy, but whether this fell directly on the postpharyngeal plexus, or, through the sequent abscess, damaged it, could not be decided. The great soreness of the muscles elsewhere, and the inflammation of the wrist, add to the probabilities of an acute toxic cause, primarily local. *Theisen.*

Fibroma of the Nasopharynx.

CHEVALIER JACKSON, Pittsburg, Pa. (*Journal of the American Medical Association*, February 17, 1906). The patient was a boy of fourteen, with a history of increased nasal stenosis. Several pieces of so-called polyp had been removed by physicians, followed always by severe hemorrhage and no relief to breathing. The dysphagia and dyspnea was very great. There was frequent bleeding, and headache and earache were frequent and severe. The right nasal chamber was occupied by a hard tumor, the right upper maxilla was bulged outward, the velum was pressed forward on to the tongue, and back of it was a hard, smooth, glistening, vessel-streaked tumor filling the nasopharynx so completely that the finger could not palpate any but the visible portions of the growth. Diplopia and exophthalmos showed the bulging upward of the orbital plate.

Diagnosis of fibroma was made. Preliminary tracheotomy under infiltration was performed, general anesthesia in such a case being practically impossible, inasmuch as respiratory arrest is synchronous with unconsciousness. The right external carotid artery was ligated between the lingual and the superior thyroid arteries. "A small probe, in whose point a small eye had been drilled, was threaded with braided silk and passed backward through the right nasal chamber. It was insinuated between the growth and the tightly stretched velum, through which it could be felt as it worked backward. When the eye point of the probe reached the free margin of the velum, the silk was caught with forceps and drawn out the mouth for a convenient length and the probe was withdrawn from the nose. The bight of a length of snare wire was tied to the nasal end of the silk, by means of which the wire loop was drawn back through the nose until it reached the pharynx. The loop was then insinuated around the presenting portions of the growth and worked upward by traction on the ends projecting from

the nose. When the loop was felt to be taut around the base of the growth, these projecting wire ends were threaded through the straight canula of a Peters' tonsil snare by my assistant.

Closing the snare handles, the growth was cut through at one stroke. The severed tumor was then delivered with strong forceps, without lacerating the palate, though this seemed imminent, owing to the tight fit of the growth.

The bleeding was about as much as from an adenoidectomy; nothing like the welling up after the extirpation of a fibroma. Anterior and posterior plugs were placed and the tracheal canula, which had been inserted to facilitate anesthesia was removed as soon as the boy came out sufficiently. The plugs were allowed to remain forty-eight hours. No bleeding followed their removal.

The temperature rose to 101 F., but returned in two days to normal. The carotid wound healed promptly. The boy was out of bed on the third day, and was discharged well at the end of the week. No sign of pulsation was yet perceptible at the temporal artery two weeks later.

The author has ligated the external carotid artery thirty-four times without in any case an untoward result. Eight of these ligations have been preliminary to the extirpation of nasopharyngeal fibromata, and in no instance has the bleeding been serious. He does not consider an operation for true fibroma of the nasopharynx justifiable without preliminary ligation of one or both external carotid arteries. *Richards.*

A True Papilloma of the Nasopharynx.

C. SCHMIDT (*Archiv. für Laryngologie und Rhinologie*, Bd. XVIII, Heft. 3, 1906). True papillomata of the nasopharynx are extremely rare, only a few cases having been reported.

Sendziak has reported a case of nasopharyngeal tumor, 6 cm. long, 5 cm. wide, and 2½ cm. thick, which originated in the posterior end of the left inferior turbinate, filling the entire nasopharynx. Hill, Jurasz and Gourand, have also reported cases.

The following case is reported by the writer: A large, soft, reddish mass, was seen in the nasopharynx of a man, aged 47 years, who had been troubled with nasal obstruction for a long time,

The growth was removed with a ring curette, similar to the Gottstein for removing adenoid vegetations.

The microscopic examination proved the growth to be a true papilloma.

The patient was examined a year after the operation, and there had been no recurrence. *Theisen.*

The Lymphatic Drainage of the Pharyngeal Tonsil.

GEORGE B. WOOD, Philadelphia (*American Journal of the Medical Sciences,* August, 1905). The lymph vessel draining the pharyngeal tonsil runs posteriorly from its lower part, penetrates the posterior pharyngeal wall, enters the retropharyngeal space, runs downward and outward just below the insertion of the rectus capitis anticus major and between this muscle and the bodies of the cervical vertebrae. From this point it runs obliquely downward and outward, passing beneath the sheath of the great vessels of the neck until it reaches a position almost opposite the posterior border of the sternocleidomastoid. It then turns directly outward and enters one of the small glands situated just below the tip of the mastoid along the posterior border of the sternomastoid. Hence, infections entering through the pharyngeal tonsil involve the lymph glands placed just beneath the posterior border of the sternomastoid. On account of the muscular covering of these glands it is sometimes difficult to palpate them.

Clinically the enlargement of these glands can be diagnosed by diffuse swelling over the upper part of the sternomastoid muscle, due to enlargement of the glands underneath the muscle. *Richards.*

Pain in the Throat Arising from the Glands of the Floor of the Mouth.

KRETSCHMANN (*Archiv. für Laryngologie,* Bd. 19, Heft. 1). The cause of many throat pains is not uncommonly found in pathologic alteration of the salivary glands of the floor of the mouth. The alteration is usually an inflammation, less commonly a simple stasis of secretion. The diagnosis depends upon the demonstration by bilateral palpation of enlargement and sentitiveness of the organs. The most effectual treatment is found in bimanual massage of the floor of the mouth and the glands. *Goodale.*

Diseases of the Pharyngeal Tonsil.

HASSLAUER (*Archiv. für Laryngologie*, Bd. 19, Heft. 1) reports a case of isolated herpetic inflammation of the pharyngeal tonsil, which showed in association with slight general disturbance marked nasal obstruction, due to swelling of the adenoid. This was deeply reddened and covered with vesicles. The process lasted 9 days, when a considerable amount of crust was evacuated from the nasopharynx. The condition resembled ordinary herpetic angina of the faucial tonsils, and probably occurs more frequently than would be supposed from the absence of recorded cases. *Goodale.*

Pharyngitis Lateralis.

W. UFFENORDE (*Archiv. für Laryngologie*, Bd. 19, Heft. 1) reviews the literature of this subject, and discusses the various etiologic factors, symptoms and methods of treatment. The paper presents an excellent resume of our information, but gives little that is new. *Goodale.*

Remarks On Some General Infections Through the Tonsils.

ADLER (*New York Medical Journal*, March 31, 1906). In a very instructive paper on this subject Adler calls attention to a number of questions in connection with disease of tonsils which are not generally known, as for instance why dogs and cats which are wont to eat everything never suffer from tonsillitis. While it is commonly admitted that acute articular rheumatism is preceded by an attack of follicular tonsillitis it is not understood that this tonsillitis may be only very slight and transient. Indeed it can easily be overlooked unless sought for. Gurich's view that concealed foci of pus in the tonsil are the cause of acute rheumatism is alluded to. Adler believes that muscular rheumatism is also in many cases of tonsillar origin. Here, as in acute articular rheumatism, the tonsillar attack may be very slight and have disappeared several days before the outset of the muscular attack. Two cases of fatal sepsis are reported where the origin appeared to be in a slight attack of tonsillitis. A number of cases of acute nephritis have been reported. The author calls attention to the fact first shown by Leyden that in fully 75 per cent of all cases of tonsillitis there is a mild, unrecognized nephritis with albumin, and casts

present. This in the great majority of cases entirely clears up with the abatement of the tonsillitis.

In a certain number of cases, however, it remains and a chronic nephritis is the result. On these accounts Adler urges that in all cases where there are attacks of tonsillitis constantly repeated, however slight, the tonsil should be removed. This is much more important in the non-hypertrophied tonsil than in the hypertrophied variety where the violent inflammation is often a barrier to the entrance of the infection. It is not always necessary to completely remove the tonsil in such cases. Thorough destruction of the main crypts will be sufficient.

Harris.

Death from Suppurating Tonsil.

KERRISON (*N. Y. Medical Journal,* July 14, 1906). The patient was a woman of 33, with no history of previous throat trouble. She was seen on the third day of the disease. Temperature was 102, pulse 100. Examination showed the left side of the throat, including the tonsil and uvula, greatly swollen and apparently ready to burst. Fluctuation was obtained. Incision evacuated two ounces of blood and pus. After the operation the temperature fell to normal. The following day there was no improvement. Large masses of sloughing tissue were removed for the next four days. At that time she began to become cyanosed. A considerable amount of pus was again evacuated but with no lasting benefit. Tracheotomy was accordingly performed. This gave only partial relief. A general edema of the neck now developed. The next day she became unconscious. Large quantities of purulent matter came away from the nose. She died the same day.

Diagnostic and Prognostic Value of an Examination of the Throat In Pulmonary Tuberculosis.

HARLAND (*New York Medical Journal,* March 10, 1906) believes that throat symptoms such as recurring colds, continual dropping of mucus from the nasopharynx, hoarseness and cough "are in themselves suggestive of tuberculosis of the lung unless explained by obvious, other cause." He is wont to find the mucous membrane of the nose wasted and bathed in seromucus. (The significance of cough and hoarseness is well recognized. It is, however, questionable whether we are at all justified in attaching such importance to post-

nasal discharge. It is far more probable that this is a symptom of some sinus involvement. Nor is atrophy of the nasal mucosa of sufficient frequency in pulmonary tuberculosis to warrant more than the conclusion that it does occur with tuberculosis in a certain percentage of cases.—*Abstractor.*)

Harris.

IV.—LARYNX, TRECHEA AND ESOPHAGUS.

On the Disturbances of Speech In Childhood.

HAMMERSCHLAG, Vienna (*Archives of Otology,* Vol. XXXV, No. 4). The author reports the case of a child, aged 5½ years, of healthy, normal parentage, who, at the age of 14 months could articulate several words and could walk. He was taken ill with measles and had a series of convulsions lasting several days. Paralysis of the arms and legs followed the first convulsion and the rudiments of speech were lost. The hearing appeared to be as good as before. After the lapse of one year such words as "Mamma," "Papa," etc., could be pronounced, but no further progress in speech was made. The skull is slightly rachitic, the cranial nerves are unaffected. In the third year it slowly relearned to walk and to run.

Repeated examination shows that the intelligence of the child is quite good, it follows all orders, though with some hesitation.

The question is whether the motor aphasia is congenital or one acquired in early childhood. The congenital type is usually found in children whose parents have presented the same anomaly in their youth or show some defect, with lack of resistance or weakness. Consanguineous marriages likewise seem to augment the anomaly of development which causes deaf-mutism and hearing-mutism.

Aphasias well as paralyses belonging to the not unusual complications of typhoid fever, scarlet fever, whooping cough, diphtheria, pneumonia and measles.

The author then gives abstracts of four cases described in literature of aphasia occurring after measles.

Campbell.

The Treatment of Tuberculous Laryngitis With Culture Products, With Observations Upon the Action of Specific Inoculations In the Treatment of Tuberculosis.

F. M. POTTENGER, Monrovia, Cal. (*American Journal of the American Sciences,* December, 1906). The author has found

tuberculin injections to work remarkably well in pulmonary tuberculosis, and cites a series of cases showing favorable results. He uses the watery extract of tubercle bacilli made by von Ruck, standardized so as to represent one per cent of the solid matter derived from the bodies of the bacilli. The dilution is made with normal salt solution, to which 0.4 per cent of carbolic acid has been added. This preparation represents a greater amount of soluble extract from the bodies of the bacilli than any other, and is considered superior in its immunizing properties. It is a stable preparation and can be kept for many months without deteriorating.

The larynx should be watched daily and the dosage should not be increased beyond that necessary to produce a slight reaction, nor should a second injection be given until all reaction produced by the first has disappeared. In the cases reported duration of treatment was from six months to two years. *Richards.*

Examination and Surgery of Upper End of Esophagus.

H. P. MOSHER, Boston, Mass. (*Journal American Medical Association*, November 24, 1906). The most important constriction of the esophagus is at the beginning, back of the cricoid cartilage. The narrowing next in importance is at the cardiac end. A half-inch bougie should pass easily everywhere. Its failure to pass is a sign of stricture. A three-quarter-inch bougie is the largest which should be used to dilate the esophagus. The esophagus begins six inches from the incisor teeth, back of the cricoid cartilage at the sixth cervical vertebra; is ten inches long, and goes through the diaphragm at the tenth thoracic vertebra, sixteen inches from the teeth.

He tabulates one hundred and six cases of stricture of the esophagus which have been observed in the Massachusetts General Hospital. Sixteen were due to swallowing some corrosive fluid; thirty-six cases were due to carcinoma. There were fifty-seven cases of foreign bodies, which consisted of coins, false teeth, round whistles, bits of bone, common pins, buckles, safety pins, stones, peach stone, button, collar button, spoon, a pair of suspenders, and six objects not named, the two most common being coins and false teeth, there being fourteen of the former and twelve of the latter.

The author uses an esophageal speculum and various instruments devised by himself for reaching into the esophagus.

Richards.

A Case of Stenosis of the Trachea With Sudden Death By Thymus Swelling.

H. COHN (*Deutsche medicinische Wochenschrift,* August 30, 1906). There are a great many references in the literature to sudden deaths in children in which nothing was found at autopsy except an enlarged thymus. In the majority of these cases there had been no symptoms of tracheal stenosis during life. Cases in which symptoms of tracheal stenosis and disturbances of the circulation occurred during life, and in which an enlarged thymus was found after death, are very rare and have been reported only by Biebert, Siegel and Hans Cohn.

The following case is reported by the author: A child, 8 months old, had had difficulty in breathing for four weeks before seen by the author. These symptoms had been much worse for two weeks, with irregular fever, and an occasional convulsion. On examination, a well marked inspiratory dyspnea was noticed, and during expiration, swellings appeared in the vessels of the left side of the neck.

Nothing could be discovered on examining the throat, but the child had a diffuse bronchitis. On percussion, dullness was elicited over the upper part of the sternum extending to the third rib. Every 2 or 3 hours, a severe attack by dyspnea occurred, during which the child became very cyanotic. All operative measures were refused by the parents. The child was found dead in bed. At the autopsy, when the anterior chest wall was elevated, a large amount of pus was evacuated. This came from an abscess of the thymus which had been cut into. The thymus was much enlarged and had been changed into an abscess cavity. Although many authors dispute the point that in cases of "Thymus Tod," there could have been any pressure on the trachea during life, in the author's case there had been undoubtedly some compression of the trachea as well as of the blood vessels. *Theisen.*

Concerning the Radical Operation for Cancer of the Larynx By Thyrotomy.

v. BRUNS (*Deutsche medicinische Wochenschrift,* September 20, 1906). Among the advances in surgery, the improvements in the technic of the radical operation for laryngeal cancer must be placed in the front rank. It is only during the

last ten or fifteen years, however, that a considerable percentage of the patients operated upon have been permanently cured. This advance is due to an early recognition of the disease when it appears in the larynx, and a proper selection of operable cases.

The first radical operation for laryngeal cancer was performed by an American, Buck, in 1851, who split the larynx and upper tracheal rings in a case of carcinoma. Two operations of this kind were performed upon the same patient, but were followed by recurrences because the operation was not thoroughly performed. During the following thirty years only a few operations were performed, and were followed by similarly bad results.

The first total extirpation of the larynx was undertaken by Billroth in 1873, although previously to that, Czerny had demonstrated upon animals that the operation was possible.

Billroth's operation, as well as fifteen other total extirpations of the larynx, performed during the next ten years, were all failures, half the patients dying as an immediate result of the operation, the other half within a year, of recurrences.

Sendziak's statistics, comprising 188 total extirpations between 1873 and 1894, showed a mortality of 44 per cent, 32 per cent of recurrences, and only 12 per cent of recoveries for at least a year. It was also shown by Sendziak that partial extirpations of the larynx offered a much better chance of success. One hundred and ten partial laryngectomies between 1876 and 1894, resulted in a mortality of 26 per cent, with 30 per cent recurrences, and 22 per cent of cures for at least a year.

Bruns speaks of the importance of the early diagnosis of laryngeal cancer, and the necessity for a strict dividing line between the intrinsic and extrinsic cancers.

His only results prove that in early cases of purely intrinsic cancer, thyrotomy is the operation of selection, and offers splendid chances of permanent cure. He has operated upon 10 cases of laryngeal cancer by thyrotomy, and seven of the patients are living, two to fifteen years ofter the operation.

To show the results of thyrotomy for cancer of the larynx, Bruns has collected 114 cases since 1890. He found a mortality rate in these cases of only 9 per cent, with 22 per cent of recurrences, and 48 per cent of cures for at least a year.

In conclusion, the author states, that endolafyngeal operations for cancer should not be performed, because they not only do not benfit the patient in any way, but are really harmful, because they may set up a more rapid growth of the cancer.

Theisen.

V.—MISCELLANEOUS.

Acute and Chronic Suppuration of the Ear and Nose the Direct Cause for Facial Erysipelas.

CULLEN F. WELTY, San Francisco (*Journal American Medical Association*, December 22, 1906). Erysipelas of the face is due to direct infection from a contaminated field of pure or mixed infections of streptococci. In the majority of these cases the infection can be demonstrated, and in those that are not demonstrated it is probably present but not found. Epidemics of erysipelas are nothing more than direct wound infection through surgeons or nurses, and so-called idiopathic erysipelas is a misnomer. The erysipelas is especially confined to the face because it is nearest the seat of infection; because the secretion of pus produces an abrasion of the mucous membrane or skin and then an inoculation follows. It may occur from the handkerchief, but is more often from the finger.

Richards.

Koplik Spots: Their Relation and Interest to Laryngologists.

H. G. LANGWORTHY, Dubuque, Iowa (*Medical Record*, October 20, 1906). In most cases measles can be diagnosed thirty-six hours before the cutaneous eruption. The characteristic spot is a tiny, pearly white one on a red background of mucous membrane, and appears earliest on the mucous membrane near the angle of the mouth and the area covered by the gums. Nose and throat specialists should be on the lookout for this, especially in institutions, as it may be possible to forestall an epidemic by a timely diagnosis.

Richards.

Aural and Nasal Examinations of School Children.

D. HOWARD WALKER, Boston, Mass. (*Boston Medical and Surgical Journal*, December 13, 1906). The hearing was tested by a whispered voice which could be heard by the average normal ear at a distance of twenty-five feet, and a spoken

voice with thirty-five feet as the normal limit. Numbers and short sentences were used, the distance which the voice could be heard by the normal ear being used as the denominator and the actual distance heard as the numerator.

Adenoids were determined by the hearing test, the condition of the drum membranes, and the general facial expression.

Of 289 children examined 23 per cent had two-thirds of normal hearing or less. There were ten hypertrophied turbinates; thirty-five septal spurs; eight deviated septums; 89 or 30 per cent had adenoids; 63 or 21 per cent had hypertrophied tonsils; fifteen showed the results of chronic suppuration of the middle ear, and three had active suppuration.

In comparing the hearing tests with the scholarship it was found that 17 per cent of those marked with the grade of "excellent," 20 per cent of those marked "good," 30 per cent of those marked "fair," 5p per cent of those marked "unsatisfactory," and 42 per cent of those marked "poor" showed diminished hearing. *Richards.*

BOOK NOTICES.

By BEAMAN DOUGLASS, M. D., Professor of Diseases of the Nose and Throat, in the New York Post-Graduate Medical School and Hospital, 1906. F. A. Davis Company, Philadelphia.

The development of technique, which has characterized nasal surgery during the past decade, has naturally been followed by the appearance of publications, monographs and papers in which this technique is described.

This is the first attempt in English, however, to include so large a portion of nose and throat surgery in a single work. Dr. Douglass has certainly presented the subject in a most admirable way, building up the details of the surgery from well-illustrated descriptions of the anatomy of the parts. The reproductions are made from original specimens, in the main, which are so arranged as to show the important factors in the various operations.

The author might have made an improvement if he adhered strictly to the established anatomic nomenclature, or at least if he had used uniformly English or Latin terms. Thus, if processus uncinatus and words of that type are employed, it would be better to designate other structures in Latin, as sinus sphenoidalis, sinus maxillaris, etc. Then again, terms such as turbinal and turbinate should hardly be used to apply to the same structure.

The submucous resection of the septum was evidently too recent a procedure for any extended attention, likewise bronchoscopy, etc.; this is unfortunate as it leaves a large gap in the subject.

The text throughout keeps well in view the object of the work; the author is to be congratulated in that he has been successful in presenting a subject so complex in such a simple, instructive way. However extensive one's knowledge of nasal surgery may be, he can learn much from this little book.

The Surgical Treatment of Chronic Suppuration of the Middle Ear and Mastoid.

By SEYMOUR OPPENHEIMER, M. D. Published by P. Blakiston's Son & Co., Philadelphia.

Perhaps the most striking feature of this work is its thoroughness. Each step of the treatment is treated carefully and

in detail, abounding in little suggestions of things which are usually taken for granted, but which are practically unknown to the beginner and are acquired only as the result of much time and sifting of methods. The text contains 46 unusually well done half-tone plates, engraved from original drawing of dissections made under the direction of the author.

The trend of the work is conservative, as evidenced by the fact that almost one-half of the book deals with treatment through the external auditory meatus.

Part II deals with the subject of operations upon the mastoid and with all the phases with the exception of the intracranial complications of middle ear suppuration which have been omitted.

Taken altogether, the work is one of the most valuable that has thus far appeared on the subject.
character, but which fall to the lot of an otologist, such as those
Koplik

Operative Otology; Surgical Pathology and Treatment of Diseases of the Ear.

By CLARENCE JOHN BLAKE, M. D., Professor of Otology in Harvard University, and HENRY OTTRIDGE REIK, Associate in Ophthalmology and Otology, Johns Hopkins University, 1906. D. Appleton & Co.

There is something very pleasing and satisfying in this little book of 360 pages, which must be commended by everyone who reads it. There is a terseness of expression without expense of clearness and a fullness of explanation which stops short of prolixity. A short sketch of the anatomy of the ear and of aseptic technique precedes the discussion of the individual conditions subject to surgical treatment.

The description of the various mastoid operations is in keeping with that of other operations, clear and concise, and yet thoroughly expressive of its most modern type. The blood-clot dressing is recommended; it is stated that, in the event of failure to organize, the blood clot breaks down usually either wholly or in part within forty-eight hours, in proportion to the extent of the infection, and there results the condition of an open wound healing by granulation tissue which is to be treated by the usual method of packing and cleansing.

Operations are also described which are not strictly aural in character, but which fall to the lot of an otologist, such as that for cervical abscess, ligation of the jugular, adenoids, subcutaneous and intravenous infusions and lumbar puncture.